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ADVANCED MANAGEMENT

Quarterly Journal

*The Society for the
Advancement of Management*

ARTICLES IN THIS ISSUE ON

Public Relations

Economic Effects of Cost Reductions

Annual Wage Plans

Economics for Industrial Engineers

Management Problems of Mobilization

Social Responsibility of Management

Theory for Administration

Method for Determining Quantities

July-September, 1940

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COMMENT

WAR is waged in factories no less than on battlefields. Indeed, after the peace treaties are signed the warfare may merely be transferred to the industrial realm. How the tools of such economic warfare are devised and how they are used becomes a matter of urgent concern to business executives as soon as it is apparent that the military struggle is to be suspended.

American preparedness to cope with the totalitarian states will of course have a large military emphasis; all this will involve the best of managerial skill in munition manufacture for a future period of indefinite length.

But the larger and more inclusive problem for American industrialists concerns the basis of their survival in a world where national or regional economies are competing as total units. There are two broad alternatives here. One is the competition of nations as economic units for trade in the "backward" portions of the globe. The other alternative, ideally possible but hardly likely in our lifetime, is the effort to realize an economy which would be trying to work in an interdependent way under some international body whose object was "from each nation according to its ability, to each nation according to its need."

Practically speaking, the former alternative of economic conflicts of interest among several regional groups seems likely. In which event two kinds of pressure are likely to be applied to American business in the near future: One is to get unit costs down so that prices can be held as low as possible. This will help the domestic standard of living and it will make easier the competition with other nations for available foreign markets. The other pressure will be to have each industry operating more fully as a unit within itself. Trade association operations, or some similar integration, will gain in popularity. The word, "cartel," is being applied to some projected collaboration in the export field.

The specific implications of all this are as yet vague. But it becomes increasingly clear that American corporations have rapidly to learn how to subordinate their special interests to those of their industry as a whole. Industries have to work internally together on a basis that assures low cost, quality product, orderly relations with workers and subordination to national authorities who will indicate the basis on which trade abroad can forward the total prosperity of the nation.

This is not said wishfully. This is an objective appraisal of a tendency already marked in its operation in

respect to commodities and products which now enter into foreign trade. When other nations are building influence and prestige by economic expansion and alliance, this nation simply cannot remain outside the range of this influence and attempt to run its industrial and agricultural operations on a formula of individual enterprise and free competition.

Realistically the "free enterprise" formula is already somewhat dated in its operation in the basic industries. At the end of this war (or during it, if it drags on for years) that formula will be confined to the luxury trades. And American industrial managers will be working hard to get low cost products and to get products (in some industries) which can compete successfully with German goods in South America, Africa and Asia.

This will mean that competitors must co-operate. It will mean that the focus of responsibility of manufacturing executives shifts from stockholders to cartel associates and governmental advisers on the economic-diplomatic front. A new aim and interest will come forward. It will be the integration of industrial plant under national auspices to preserve national aims in a world arena.

How all this will affect the actual day-by-day workload of line and staff men in the factory, it is not possible to visualize in full.

The consequences should include the placing of a higher value on technical engineering knowledge, fuller appreciation of capacities to sustain leadership and morale among the men at the bench. Fuller use of machinery and electrical power, sustained process and product research, study of optimum size of plant—these will be urgently pressed. If the internal life of the plant remains on the surface not vastly different, there will nevertheless be a qualitative difference, especially in industries where goods go into export. It will be a difference in professional attitude at the managerial level and in total working attitude at the level of other workers.

The implications of this whole tendency for executive education should be obvious. Executive habits of thought do not change in these times as fast as the facts of economic readjustment. The new generation of executives will have to see their tasks in their new and (to Americans) strange setting of world forces. In summary, these are forces of integrated, industry-unit operation under some kind of trade association, cartel-

(Please turn to page 103)

The Development of A Sound Public Relations Program in Industry¹

By C. H. MURRAY

Assistant to the President, The American Rolling Mill Company, Middletown, Ohio

ALL over the country industrial groups are getting together to devise new methods and new policies for improving public relations. Why? Because there is more sniping at industry and industrialists than at any time in our history, and a sound public relations program can be valuable insurance in safeguarding our respective companies. That the basis of these attacks springs from our national economic problems, we must all admit.

Just a few days ago a certain prominent labor leader stated, in effect, before a Congressional Committee that industry, through technological development, was throwing human beings to the wolves, and that industrial management was not interested in solving the unemployment problem. We know such a contention is false, but we must agree that it represents, in a nutshell, the opinion of a large segment of our population.

Why should business have to justify itself to the public?

It all stems back, in my opinion, to the type of government under which we live, a type of government that guarantees free speech, and doesn't qualify that privilege by insisting that what is spoken be facts and truth. The viewpoint of those who express themselves most clearly and most effectively is bound to prevail. This is the essence of democracy. And carrying this thought a little further, we must also agree then that business has not been as effective in stating its case as have those who state the case against business. This is not any condemnation of the inability of business to state its side of the case. We are faced with new conditions to which we must adjust ourselves—and I feel that adjustment is rapidly occurring.

How can industry best tell its story to the public? Is the better method through broad national organizations such as the National Association of Manufacturers and the United States Chamber of Commerce, or through industry-wide associations such as the American Iron & Steel Institute? Or is the best method to apply the

"grass roots" principle, each corporation conducting its own public relations program? You and I can't do it individually.

It is to the "grass roots" principle that I shall direct most of my remarks tonight. However, all media have a job to do. Each needs the other to complement its efforts. The story of business must be told and retold. Without the application of confidence building policies in the individual manufacturing establishment, which represents the point of contact between the public and industry, the national organizations are utterly powerless to make any lasting contribution.

People make up their mind about business as a whole, or about any particular unit, either as a result of their individual treatment, or from what they see, read or hear. It is each company's responsibility to so conduct its affairs and regulate its conduct in such a way as to win the confidence and good will in its own community. When this is accomplished, our national problems will shrink into insignificance. Our national problem is nothing more than a multiplication of our various local problems.

A Matter of Company Policy

There are some who believe that public relations is necessary for the large organization but out of the realm of financial possibility for their company. This is a misunderstanding. These people confuse the establishment of a public relations department with the fundamental problem. In every company, large or small, relations with the public go on day after day. Supervisors make decisions; employees come to see us about their problems; goods and services are exchanged with customers—there are hundreds of instances of what might accurately be described as public relations in the day's work of every corporation.

It isn't even essential to maintain a separate public relations department to have good relations with the public, provided some one in authority is delegated the responsibility. One of the most outstanding jobs I have ever seen was carried on by the president of a

¹ Paper presented at a meeting of the Toledo Chapter of The Society for the Advancement of Management, April 25, 1940.

small company. On the other hand, in the same city is a corporation of about the same size where no one has ever paid the slightest attention to the public interest. The result is that the first corporation stands high in public esteem while the second has few friends in the community. The unfortunate part is that the second company is managed by a man who is just as honest and sincere as the first company's president. It pays just as good wages and contributes just as much to civic betterment as the first. Yet it shirks its public contacts. As a result, the public is uninformed and it makes up its mind on the basis of the information it possesses.

I know that when my connection with public relations was mentioned by the chairman, there must have arisen in your minds the vision of a large busy department, with clicking typewriters and publicity men darting here and there. Actually our public relations department consists of one man.

Our experience has taught us that public relations is an important phase of management—not something separate and apart. It starts with the president and works downward to the least important supervisor. It encompasses everyone in any executive position whatever. How our superintendents and foremen conduct themselves on and off the job, how fairly they deal with employees, how they live up to their community responsibilities—all influence what the public thinks of us, for after all, corporations have personalities just as individuals.

At this point we might ask who is the "Public" in "Public Relations"?

As we have analyzed the situation, there are four major groups concerned. These are:

First, the stockholders who own the institution.

Second, the employees of the company.

Third, the customers of the company.

Fourth, the public affected by its operations.

Management will account for its stewardship to its stockholders through special reports on "out of the ordinary" conditions or emergencies, and through clear and attractive financial statements.

Management should also see that its customers are informed of its policies with respect to the treatment of employees and its methods of doing business. Few of us need much assistance in customer relationships. Either they are generally satisfactory or we go out of business.

Good employee relations have a tremendous influence upon public relations. The company which fails to pay fair wages and deal fairly with its men may have difficulty in winning public good will. On the other hand,

the employee who has confidence in his management can be a mighty effective force in winning friends for his company. After all he is an employee at most but forty hours a week. The remaining 128 hours he is the public.

Good public relations always begin at home in the plant. They spread outward to the public in ever-widening circles. Just where employee relations stop and public relations begin, no one has ever determined. Because of their close relationship, our company combined both activities under the direction of the assistant to the president some ten years ago.

There are few companies which do not operate in accordance with rather well-defined policies. In recent years many companies which have been interested in improving their relations with the public have written their policies in clear, simple language, and published and distributed them to all groups.

Every organization needs a "constitution," and published policies become the constitution of the industrial organization. They are the bench marks by which the hundreds of supervisors and others empowered to make decisions affecting other people may check their decisions. As such, they greatly improve the consistency of those decisions.

Published policies also serve as a guarantee of fair treatment to the working organization, especially when accompanied by the right to appeal to higher authority all decisions not squaring with policies.

The third by-product of publishing our policies comes from the community, the consumer and the public. To these groups, published policies, when honestly and faithfully applied, serve as a pledge of fair dealing to all groups.

At the same time, any company which does publish and distribute its policies assumes a solemn responsibility to see that they are honestly and sincerely carried out.

Our own company published its policies in 1919, after securing the formal approval of the Board of Directors. They were distributed to the organization then and periodically ever since.

Let me give you some idea of our policy statement:

Compensation: To provide not only fair remuneration, but the best Compensation for service rendered that it is possible to pay under the changing economic, commercial and other competitive conditions that exist from time to time. It is *Armco's* ambition to develop an organization of such spirit, loyalty and efficiency, that can and will secure results which will make it possible for individual members to earn and receive better compensation than would be possible if performing a similar service in other fields of effort.

Incentive: To provide every possible and practical sound Incentive to best effort, as it is the great mainspring of all human accomplishment.

Opportunity: To provide every possible Opportunity for advancement, as it is the ladder on which the individual hopes to reach his ultimate goal—his heart's ambition. Without such a ladder, there can be no such hope, and without hope, life may be a failure. It is a fixed *Armco* policy to provide such training Opportunities as will give the individual substantial aid to his advancement.

Working Conditions: To create and maintain both good and safe working conditions. *Armco* believes that good and safe working conditions, in the fullest sense of the expression, are absolutely essential to industrial efficiency and progress. For that reason, concerted effort is continually to be made to provide equipment such as will make for cleanliness and orderliness and safety, and such training as will reduce to a minimum the possibility of accidents through the organization.

Environment: *Armco* believes that, individually and collectively, we are the product of the Environment in which we live and work. It believes that clean, orderly approaches and mill yards help to make us walk straighter, think clearer and feel finer than do uncared-for premises, and that a good Environment is the foundation of the home.

Mutual Interest: To encourage such organization activities as will clarify and enlarge the Mutual Interests of all who are working with the management of the Company. Mutual Interest is the "cement" that binds a group of men and women together in every sort of productive effort. Without a true "Mutual Interest" there can be no serious application, no real loyalty, no cordial co-operation, and little chance for concerted and effective effort.

Co-operation: Through the operation of an Employee Representation Plan a measure of understanding has and always will be developed that will result in real Co-operation between management and the organization at large.

Co-operation is the medium through which all great accomplishments are attained. Success, ultimate and complete success, depends more on a spirit of helpful co-operation than on any other one factor.

We all know that as our corporations have grown in size, our human relations problems have multiplied, so that taking the mystery out of business has become one of the most important responsibilities of management.

To you and to me, our own company is not so complex. We see it as a group of co-ordinated operations brought together under one general management. The basic principles underlying the successful operation of each of these units is relatively simple, and fundamentally not so different from operating a grocery store or a filling station. But to John Jones, machine hand or strip mill oiler, unless he is enlightened through some educational program, the company represents an inexhaustible supply of wealth, the Board of Directors are representatives of that popular devil known as "Wall Street," and the general management, whom he seldom

sees, is interested only in "stretch outs" and other means of dragging more production out of the workers, so the bosses' sons and daughters can ride on expensive yachts, and otherwise revel in luxury. You may feel that this is overdrawn, but thousands of workmen and many people not connected with industry do feel this way. And they will continue under false illusions as long as management does not enlighten them. So the fundamental objective of public relations should be that of simplifying the corporate structure and rationalizing its actions.

All the confused thinking and misrepresentation that exists today demands that industry devise new and better methods and practices for creating understanding. The individual company can't undertake to educate the entire country, but it can assume its share of responsibility in its own community, at least to the extent of keeping employes currently informed on the progress and problems of the company upon which their employment depends.

Information Methods

Before discussing methods of employe enlightenment I feel that it is only fair to state that there is no real substitute for personal contact between representatives of management, employes, and the Public. However, most companies have grown so large that personal contact is impossible with all but a small percentage of these groups. Modern methods must be found for getting information quickly to all employes and to the Public in our communities.

Of these the public relations director has many at his disposal. First, there is the employe publication. When edited by men or women who understand the psychology of the workman, the employe publication can do much toward stimulating sound thinking throughout the organization.

Then, there are many other ways such as special annual reports for employes, the distribution of worthwhile literature, and making good use of plant bulletin boards. Recently, the president of an important corporation purchased time on the radio to explain the 1939 report to employes, and advised all to listen. We are making definite gains.

Perhaps the most recent development in this field is the employe news letter.

You may be interested in this development, and some of the reasoning which led us to start it.

Realizing that we were doing a "spotty" job of getting information to our employes, we had for several

years attempted to devise some better method. Then one day we noticed a peculiar thing. We noticed that our executives, when going through a stack of mail, would stop and read a certain type of literature. That literature was the typical economic forecast letter, issued by many economists and business houses. Why did they stop to read such letters? To keep informed on the business situation, the political or legislative situation, and the business outlook.

So we reasoned that if such letters had the power to halt the hard-pressed busy executive, certainly an adaptation of the idea would be no less interesting to the employe in the mill. We believed that, if anything, the employe whose standard of living frequently varies from week to week in accordance with the size of his pay check would be even more interested, provided the theme of the letter was centered about the employe's job and the outlook for operations and work, all of which affect the pay check.

As a trial, we started an employe news letter in one plant. The results were very gratifying. Men were observed to read the letter before consulting the pay advice slip which accompanies the pay check. None were thrown away. Fearing that it was only a flash in the pan, we continued the experiment for about one year. Then letters were started in all our other plants and in our general offices.

These news letters, written and signed by the Works Manager, are distributed by the paymaster each week along with the pay check. This represented a distinct deviation from a long standing policy of not distributing anything with the pay check, but we felt the two were so closely related that this was the psychological place to make the distribution.

They contain an honest appraisal of the short-term business and operations outlook; a comparison of our rate of operations with the industry; examples of quality and service of our product both favorable and unfavorable; new developments such as new outlets for steel sheets and the installation of new equipment in our plants; outstanding cost and production records; simple general economic information and other related subjects. Every attempt is made to appeal to the employe's self-interest in protecting his job through quality workmanship, and we attempt to avoid anything which might be construed as propaganda. Briefly, they contain information that any manager might discuss with an employe across the desk in a personal endeavor to convey to him a picture of the business situation.

After considerable experience with this method, we

found that it possessed a valuable by-product which we did not count upon. We discovered that the men were taking these letters home and their wives were reading them. Now the wives are the acknowledged purchasing agents of the nation. They spend the family income, if my experience is similar to yours. Usually they are the conservative member of the family. So unconsciously, we enlisted an able and helpful ally in maintaining friendly relationships with the home.

After more than two years' experience, we have definitely concluded that a properly edited news letter is of great value and assistance to management in getting complete information to employes quickly, economically and thoroughly. We have the medium for reaching our employes and are limited only by our own ability to tell our story.

Every parent with a child in the grade schools knows that though his young hopeful may seriously question what his father tells him, yet what the school teacher tells him is law and gospel. Similarly, what the doctor, the lawyer, the minister—what the entire retail and professional group has to say has a tremendous influence in creating the right employe and community attitude. We in industry must remember that these retail and professional people are not only retailers of goods and services, but retailers of information. They are the most important factor in molding community opinion. Moreover they are usually the active leaders in most civic and community institutions.

This group of professional and business people are natural allies of industry. They have the same fundamental problems of paying taxes, meeting payrolls, building up reserves, buying, selling, etc., as industry. In fact, their prosperity depends to a large extent upon industrial payrolls. But too often are they unaware of their natural dependency upon industry—too often are they unaware of the mutuality of problems. Every sound program of public relations must take this important group into account.

I should like for a moment to describe briefly our company's method of enlightening the retailers and professional people.

Mr. Charles R. Hook, our president, writes a short editorial each month on some subject of timely social or economic importance. Everything is written from the point of view of the consumer, or reader. These editorials are then published in the employe newspaper. Reprints are then made and sent by direct mail to all the cafe owners, priests, ministers, doctors, teachers,

garage owners, grocers, etc., in each community in which the company operates plants.

Our president has hundreds of letters in his files from the three thousand retail and professional people in our plant communities. They write in almost every month to express their appreciation for giving them a clearer understanding of some mutual problem.

There are many concrete illustrations of the effectiveness of these editorials. As just one example, I recall that when efforts were being made down in Washington in 1937 to enact legislation to eliminate the basing point method of steel pricing, an editorial was immediately written on this subject. The economics of the basing point method were explained, as well as the probable effects of its elimination upon the community.

So concerned were large numbers of retail and professional people, that they asked that we hold a mass meeting and discuss the subject in more detail.

Both the editorial and the talks at the mass meetings were confined exclusively to a frank discussion of the subject. No one was asked to write his Congressman; no one was asked to do anything. However, we were amazed at the great number of contacts possessed by this group. Members of both political parties flooded their elected representatives with personal letters and telegrams, and we learned later that this was an important factor in influencing the Committee hearing this bill to strike from it the section pertaining to the basing point.

This, and many other examples of a more local nature, again emphasized to us a very fundamental law of human nature which we had applied in employee relations for many years—when people have the same information about any given subject as we have and recognize their identical interests, the great majority of them are going to react as we do.

Now most companies assume a goodly portion of the expense of charitable, recreational, health and character building organizations. Still too many companies stop there. Too many of us fail to supply the leadership or to co-operate closely with the leadership of these community institutions. Too many of us fail to encourage our officers, supervisors and employees to take an active part in such activities. Until we do learn to become a vital part of community life, we can't possibly expect to win and hold lasting good will.

Even though a company be highly decentralized, even though its plants may be scattered from Texas to Canada and its general headquarters in New York, each community in which its branch plants are situated will

be influenced by the acts of that particular unit of the corporation within its boundaries. The president of the corporation may be the nation's leading philanthropist, but unless the local management maintains a proper relationship with the community, that company will be a "heel" to the local residents. Our own company has had to face this problem of absentee ownership. However, we have found that when local managers are trained to appreciate community responsibilities, and when they understand company policy, and are authorized to make decisions on community problems without delay, absentee ownership does not present the slightest barrier to good relations with the community.

The combined populations of the cities in which our major plants are situated is over 200,000. We consider that we have a responsibility not only for what these people think about *Armco*, but what they think about industry generally. It is, and has always been our philosophy that through keeping people informed we create understanding and confidence. And when we have understanding and confidence in the plant or community, we also have an environment in which trouble, due to misunderstandings may start, but cannot thrive.

It is important that any company know what the community frankly thinks about it. This is the only measure of whether the public relations program is successful in doing what it is intended to do. One further result of our community relations program is that it creates such close acquaintanceships that the merchants and professional people do not hesitate to call and frankly give us the community reaction. Since they daily come in contact with such a large segment of the public, their opinions represent a true cross section of public opinion.

Thus far, I have refrained from discussing press relationships in the public relations field. Frequently, we confuse publicity with public relations, whereas publicity is but a tool for achieving good relations with the public.

Most of us realize, I am sure, the importance of technical, trade and national magazines. But frequently we overlook the importance of the local medium, such as the newspapers and radio stations in the community. Sometimes we even regard them as a nuisance.

If the *Saturday Evening Post* or *Collier's* were to wire most any of us that a writer was on the way to do a story on our plant, we would sit up all night in order to see him. But when the local newspaper phones the plant for a story on this or that development, or about some accident that has occurred, or some other indus-

trial story, the information is frequently forthcoming in a very sketchy form if at all. As a result we have all seen some highly-garbled, fantastic news stories. Well, the fault doesn't all lie with the newspapers. When we supply the press full and complete information, we usually get an accurate story.

Industry can help the newspapers and the newspapers can legitimately help industry. Newsworthy events are occurring almost every day in the life of most companies. People are vitally interested in industrial news. Practically all newspapers are anxious to tell the industrial story, if industry will take the initiative in anticipating and preparing the news in an interesting manner.

Furthermore, in the editor or in the editorial staff, industry has available capable advisers in establishing public relations policy. These men know the community—they are familiar with community conditions and problems. The editor usually is a capable, intelligent man—the kind of a man we would like to number among our personal friends. When management takes him into its confidence, when it keeps him informed, it will find his advice readily forthcoming, well-qualified, and of great value in making decisions on any question affecting its relations with the public.

I should like to mention just one more means of creating good will. The average industrial plant usually has a high fence around it, with a uniformed watchman at the gate. What goes on within that fence is a deep dark mystery to the public.

We try to level those fences by inviting the Community to visit our plants. In one twelve-month period, over 60,000 persons attended open house celebrations in three of our major plants. Our employees—not the management—are their hosts, and they do a remarkably fine job of explaining the processes to their neighbors and friends. The wives and children of our employees also turn out in large numbers. You can imagine the pride of a father showing his family and neighbors where he works and explaining the importance of his efforts on production.

We have been opening our plants periodically to the public for years. Each time the invitation has gone out,

the public has responded in large numbers. One of the disappointing things has been that other industries in these same communities do not open up their plants, even though members of their managements and their employees are always on hand when we open ours.

Before concluding I have only one more point to make. If we look upon public relations as a stop-gap, a cure-all, or a white-wash to stop the growing spread of radicalism, then we are just postponing the evil day. But if we of industry are willing to establish sound policies, and pursue them aggressively, we will build a strong line of defense which will safeguard our respective institutions and go a long way in insuring the continuation of the private enterprise system in this country.

That is the important thing to all industry, large or small. We may disagree as to definitions and objectives of public relations, we may disagree as to the methods to be employed, but we will agree that if the private enterprise system is seriously changed or destroyed, it won't make much difference what we disagreed about. The past few years have demonstrated that the critics are slowly but surely changing that system. They do not distinguish between the great majority of honestly managed progressive companies, and the small percentage of the other kind. They measure all by the same rule. A broad attack requires a strong, broad defense. We can no longer be merely manufacturers of steel, or glass or automobiles. We must strive to become leaders each in our own community. We must tell the story of our own industry, and tell it well. And there are very few companies which do not have a real story to tell, a true story. But no one will tell it for us—no one is better qualified to tell it than management.

When management, generally, considers public relations an important function of business, to be conducted with the same relative seriousness, aggressiveness and intelligence as research, engineering, sales or manufacturing, we will have gone a long way toward bringing to the public a clear understanding that further social progress depends upon a strong industrial and business structure.

Comment

(Continued from page 97)

ized supervision. The pressure will be for a price and a product that will stand up in foreign trade (directly or indirectly). The need to provide representative participation of labor union officers in this super-corporate

control agency, will also offer a new area of fresh administrative pioneering.

A drastically new kind of economic world requires a daringly new kind of executive thinking.

The Economic Effects of Cost Reductions¹

By CLINTON S. GOLDEN

Director, Northeastern Region, Steel Workers Organizing Committee

SINCE I am not an economist I can't tell you what is the optimum ratio of payroll to overhead and the price of raw materials, or how to enable you to make 6 per cent or better on your investment, or what the fathers of economic thought have to say on this subject. To avoid any jurisdictional disputes, I shall leave those things to the more learned gentry.

I am a labor union executive and therefore propose to discuss what I regard as labor's attitude towards the realities of cost reduction. This point of view may be something new in relation to a discussion of cost reduction, for all too frequently in the past those in charge of such activities have either not realized that labor had any views on the subject, or if labor had any views, they ignored them. Too many so-called scientists in management have been prone to believe that they knew all the answers, and that labor could either take their edicts or leave them. As a result there have been a multitude of sins committed in the name of "scientific management."

In this discussion of cost reduction I am going to attempt to help prevent such practices from spreading further. I am going to present this topic from two angles:

1. The impact of technological change upon labor.
2. Efficiencies and improvements which can result from a joint management-union research of production problems.

Fear of the machine and industrial efficiency programs has been real and deep-rooted among the individual workers since the industrial revolution and the widespread use of the machine to replace hand labor. In the days of the Luddites the workers smashed the frames that were taking away their jobs and rendering useless the skills acquired in long years of domestic handicraft. These early nineteenth century Englishmen saw only that here was a machine that could do the work of a dozen men, paid at a lower scale. They reasoned therefore that the machine was their enemy. They banded together for protection against the machine.

This attitude has been found everywhere during the growth of the factory system. It has become intensified when periods of furious production have led to stagna-

tion and inactivity for men and machines alike. And management generally has unwittingly encouraged the preservation of this fear. Whenever a machine was installed without notice to, or regard for, the workers displaced; whenever piece work, tonnage, or incentive rates were peremptorily cut upon the introduction of a faster operating machine; whenever a new machine worked so fast that its operators were made idle half the time; whenever a new machine suddenly rendered obsolete industrial skills acquired in long and painstaking work; whenever a new machine pushed human effort beyond endurance; whenever a new machine was installed on a remote site making it difficult or impossible for the older displaced workers to take jobs on it—then management aroused in labor a distrust and opposition to technological advance.

Of course, we can say that mechanization of industry has brought to society generally benefits in the form of lower prices, better quality and improved participation in the products of industry. Of course, management's introduction of technology has been supported by the classical economists with the argument that in the long run there is no technological unemployment. But this is a poor argument to the individual worker who has just lost a job he has held for twenty-five years. He reasons, and quite accurately, that even if there may be increased employment in the end there will either be no use for him because of his age and obsolete skill, or because he'll be dead by then. The continuous strip mill in the steel industry is a pertinent example here. In the long run, it may be of great value to the consumer and the general public as well as to the individual companies installing them. But at present it is nothing more than the grim reaper of unemployment to the men in the hand sheet mills and to many communities.

This is the attitude of the individual worker. Now what I have been saying about the fears of individual workmen is not necessarily true of organized labor, particularly in the industrial union. The industrial form of trade union, like management—perhaps even more so than management that is confined to the welfare of an individual plant—has a national and a long-range point of view. Accordingly it does not oppose techno-

¹ Paper presented at a meeting of the New York Chapter of The Society for the Advancement of Management, April 18, 1940.

logical change as such. We in the industrial unions have no objection to industrial advance or the introduction of machines to make it possible to produce and sell for less. Indeed, we are, as I shall presently illustrate, in favor of any program of increasing production, decreasing unit costs, and improving quality. But we do object to the manner in which it has been done in the past.

Social Consequences of Technological Improvement

Let me explain our position by reference again to the continuous strip mill. In one of the larger steel towns of Central Ohio notices were sent out to some five hundred workers of the company which dominated the community. The notice read as follows:

"We regret to advise you that on account of the permanent discontinuance of operations of the Massillon sheet mills your services are hereby terminated.

"Please find enclosed your copy of the 'Termination Notice to Employment Office.' This form should be presented to the paymaster to secure any earnings which may be due you.

"Also find enclosed 'Workers Copy' of Form UC 406, 'Separation Report for Total Unemployment' as provided under Unemployment Compensation.

"Yours very truly,"

I don't believe you can expect working men to be very enthusiastic about technological changes when that is their reward. True, the men expected something of the kind. They had seen the company build a great continuous strip mill some miles away. They knew that this great piece of machinery could produce in a single day more than they had been able to turn out in weeks or months. As a result, they knew that there was no further use for their highly skilled work in this company, and there was nothing they could do about it. This mill was the major industry in the town, and there was no other place for the men to go. Even if there were other industries, it would not help these men much in view of their age and now obsolete skills. It is little consolation to these five hundred men to be told that this continuous strip mill would result in some expansion elsewhere, and that a number of men somewhere else would receive jobs. These five hundred men are thinking of themselves and their families. And if the management of this huge continuous strip mill would place themselves in the shoes of these men, their glee and pride in the efficiency of the mill would be dampened considerably.

I want to carry this discussion of the effect of the continuous strip mill a bit further now to give you the complete picture. Another company built a new fifty-million dollar continuous strip mill just recently. It selected a remote spot not far from Pittsburgh. There is no community to speak of within walking distance of this mill. Within the mill every piece of machinery, down to the smallest screw and bolt, receives the best of paternal care. But the men employed in the mill are not so fortunate. They are hired on probation. Many live in hovels, crowded shacks, trailers. Many married men have left their families behind them because of the lack of housing or because of the insecurity which prevents them from acquiring homes. And elsewhere in Pennsylvania and Ohio the company has closed down its handmills, converting a number of communities into ghost towns. Displaced workers walk the streets of these towns not knowing where to turn.

This is the final product of one of the technological marvels of this century. Here from the point of view of an individual manager or an engineer the cost reduction system has worked perfectly, but from a human and general point of view it has failed dismally. It represents, socially, one of the worst aspects of technological change. We do not say that the strip mills ought not to have been built. But we do say that a little more intelligence and regard for the social responsibility of industry should have been in order. And it is not labor alone that holds this view. Mr. Edward R. Stettinius, chairman of the board of the United States Steel Corporation, told the Alexander Hamilton Institute:

"When a whole community can stumble into despair with the stoppage of a single payroll, it is self-evident that industry has far-reaching social implications which should be matched by an equal sense of social responsibility. It is no exaggeration to say that one of the most important functions of business administration, on the large scale, is the social function. Having helped to create the modern society, the business man will not be excused from the duty of coping with its problems."

I suppose that when you bring the social point of view into a discussion of cost reduction, a number of people will say: "So what?" They may say they are in business for profits and are not philanthropists. There is just this much to remember. The cost of these displaced workers will have to be paid by somebody—and industry is going to contribute a major share, make no mistake about it.

What ultimate purpose is served by the reduction of operating costs if the end result is increasing unemploy-

ment, growing relief rolls, increased taxes to provide funds with which to feed unemployed people who want to but cannot work? Is there any such thing as "economy" in cost reduction with these end results?

And to illustrate the effects of the continuous strip mill, I want to present you with some statistics on the cost of production of tin plate. These were given us by one of the companies engaged in the business. The total cost of production of tin plate on the hand mills is \$4.72 per base box which weighs about a hundred pounds. This includes labor, steel, tin, supplies, overhead and all other elements of cost. On the continuous strip mill the cost per base box is about \$3.91 or a total saving of about \$.808 per base box. Actually there is a reduction in labor cost of almost \$.88, but part of this saving is taken away by the rise in other elements. This total saving amounts to \$17.77 a ton in the manufacture of tin plate. On the surface that may look like something to brag about, but before doing so let us examine the whole picture.

In the first place, this saving has not been passed to the consumer in the form of lower prices. The price of tin plate has not been reduced.

The workers haven't gained anything from this technological advance. The 57 per cent reduction in labor costs (from \$1.52 to \$.643 per base box) has brought about lowered income, intermittent employment and unemployment.

If we go further, neither the communities nor the nation as a whole has benefited. There are dozens of ghost towns as a result of this cost reduction. The local and national governments have to bear the social cost of providing for the workers and their families who are victims of technology. There is an increase in the tax burden upon the rest of us to care for the 80,000 workers displaced or to be displaced by these mills.

And there you have it. \$17.77 saved per ton of tin plate by the steel companies. But does this compensate for the social over-all increased cost of tin plate to the nation as a whole? I think not.

This aspect of technological advance is just as true in industries other than steel. It is a national problem which calls for the joint efforts of all concerned to solve. By putting off the job of solving it, management is simply postponing the day of reckoning which is certain to come; and in the meantime the total cost, like interest, is growing.

There is another form of technological change, which although not as important as the first, yet is significant and has given rise to countless difficulties. I refer to

the distribution of benefits made possible by improved machinery and equipment which increase production. Almost all industries are constantly spending money on new model devices which speed up operation. A motor with greater horsepower is installed in the temper mills, and the coils now rush through at a basic speed of two thousand feet per minute instead of the former sixteen hundred. Old annealing boxes are replaced by new continuous boxes which can handle one and a third as much steel at a time. The capacity of the open hearth furnaces is increased. Whereupon management argues that since it has made an investment and since this investment alone is responsible for the greater productivity, it—management—is entitled to a return of the full benefits. And management usually seeks to secure this by reducing the incentive, tonnage or piece work wage rates to labor. Let me illustrate by actual instances which have arisen in the steel industry.

One of the independent steel companies recently installed twelve new type annealing boxes which increased productive capacity by 33½ per cent. This equipment cost many thousands of dollars. A number of workers were displaced. Thus fewer men could now, with the new equipment, handle more steel than formerly was possible by full crews. The men were being paid on a tonnage basis and the company therefore proposed that the tonnage wage rates be reduced, for if they were not then the workers' earnings would shoot up as a result of new conditions introduced by the company. Management argued that it and not the men were responsible for the improvement, and therefore it and not the men ought to get the benefits. It also pointed out that the new equipment, too, will eventually wear out and that provision has to be made for its replacement, and, in addition to this, the money with which to purchase the annealing boxes had to be borrowed and the company must now meet the interest and retirement charges.

The Union's Response

This plant is under contract with the Steel Workers Organizing Committee, and through it the men replied to the company; that although it was the new equipment that made possible the greater production, more steel now had to be handled by the men, thus requiring greater effort at higher speed and with the consequent increase in tension and responsibility. The union pointed out that a number of workers had lost their jobs in the changes, and no provision had been made for them. And finally the union demonstrated that faster produc-

tion in an industry with as many vicissitudes as steel inevitably results in quicker layoffs, and that for every increase in speed now there was going to be a corresponding lengthening of idleness later. Certainly management is entitled to a return on its investment, but not entirely at the expense of labor. For labor too is entitled to a return for its investment in skill, loyalty and years of experience. The SWOC suggested a compromise whereby the benefits of the increased production were to be shared equally by management and men. And this was substantially accepted by the company.

In connection with another case the SWOC proposed a procedure for the settlement of such questions and I should like simply to quote it here:

A. When management decides that a study of existing rates in any mill or subdivision should be undertaken, it will acquaint the union grievance committee members with its reasons therefor, plans for the conduct of such study, and seek the co-operation of the employees directly affected through the medium of the grievance committee. When the study has been completed, and the proposed new rates computed, management representatives will again consult with the committee and endeavor to reach an agreement as to their fairness and equity. Should this prove impossible for any reason, they should endeavor to reach an agreement for the institution of the proposed rates for an agreed upon period of time which will serve as a trial or experimental period. It should be understood in the meantime that average earnings are not to be reduced.

At the conclusion of the trial or experimental period the results of the study and the related facts and experience accumulated may be further reviewed jointly by the management representatives and the union committee for the purpose of making such further adjustments as the facts and experience accumulated warrant.

B. It is expected that the foregoing procedure will narrow down the area of differences to the smallest possible dimension. Under these circumstances if an irreconcilable difference appears to exist, this can then be set forth in the form of a grievance to be taken up under the fourth step of the grievance procedure.

Only by some such procedure as this can the interests of both management and labor be safeguarded amicably, and I might say that one such case involving a large steel company and the SWOC is now in the hands of an arbitrator who is a professor of business law and economics at one of our eastern universities.

The second aspect of cost reduction that I should like to discuss is that which may be brought about through the initiative of labor. It is the union's complement to management's technological improvements I have just discussed. As I have already indicated, labor is as interested as management in cost reductions. But labor is also interested in the manner this cost reduction is brought about. If you can assure labor that its interests

will be safeguarded, you will find it to be your most zealous exponent of productive efficiency and unit cost reduction. If you reason with workmen, and if they are protected through collective bargaining, you will find no antagonism towards scientific management. They hate and fear the man with a stop watch not because of the principle involved, but because they expect to be the victims of it all. They feel by instinct that a speed-up will follow, that their piece work, tonnage and incentive rates will be reduced, or that even their jobs will be gone. A number of the leaders in the field of scientific management have realized this, and have hammered home the point that labor must be sold on the scheme if any wage incentive is to work.

Labor's Participation

Now the way to secure labor's co-operation today is to have it participate in the setting of standards. Then the benefits of the increased productive efficiency must be shared equitably with the workers.

The Steel Workers Organizing Committee has issued a pamphlet entitled "Production Problems," the purpose of which is to stimulate joint employer-union research with a view to cost reductions. And the introduction to this pamphlet quite frankly states why labor should be interested in cost reduction. It says:

This handbook tells about ways of making industry able to meet the demands of labor for higher wages, shorter hours, security of the job and better conditions. It is about things a union can do after it has established itself and has won collective bargaining.

The first business of any union, of course, is to bargain with the employer and to get the best terms he will grant. But the union will find eventually that there is a point beyond which the employer will not or cannot go. When asked for a wage increase, or a reduction of hours, he may say, "I can't afford it; the company is not making enough; it would put me out of business." Or he may say, when asked for a change in working conditions, "It would cost too much; I would have to raise the price of my product and so would lose business to competitors." Or when asked to take on more help and reduce unemployment, he may reply, "I'd like to, but there isn't enough sale for what we make."

Employers often say these things when they are not true. The union ought to have some way of finding out whether they are true or not. But suppose they are true. What then? Is the union to try to enforce its demands at the risk of putting the employer out of business? Or is it simply to lie back and do nothing?

There is something else that often can be done about it, something that has been done in dozens of cases. Suppose the union could say to the employer: "We will show you a way to save money enough to grant the wage increase." Or, "You

can make the changes in working conditions that we want, and yet have lower costs than you do now." Or suppose the union could say, "There is a way to sell more of your product so that you can employ more people." If the union could say such things, it would have additional bargaining power. It would have something valuable to offer the employer in exchange for what the members want.

Such a thing sounds like a miracle. How is it possible for the employer to pay labor more and still not have less himself? The answer is simpler than it looks. Almost any shop or mill is full of wasteful practices. There are many workers in any large-sized establishment who could offhand, as a result of their daily observations, give the management hints as to how it could save money and put out a better or a less costly product. If this knowledge were collected and applied, the establishment would be better able to meet labor's demands.

If a systematic study is made with the help of an expert—an expert working for labor as well as for management—a great many unsuspected ways of making economies can often be discovered. Labor with good reason distrusts the ordinary expert, because the economies he suggests are likely to result in speed-up or wage reduction or unemployment. But there are experts who can find better ways of doing things which benefit rather than injure the workers. When labor by its organized strength can make sure that better methods will not be turned against it, the union may use experts with safety and with benefit.

Under this program for cost reduction the following points are to be agreed to:

1. The union agrees to co-operate with the management in order to reduce costs, enlarge sales, improve quality and in general to advance the interests of the industry.
2. The management agrees to share equitably with the union any benefits so obtained, in the form of increased employment, better working conditions, increased wages or decreased hours.
3. Nobody is to lose his job as a result of any improvement that is installed. If ways are discovered to do more work with less labor, they are to be put in gradually, and then only with the consent of the union.
4. The research must be truly joint in every respect. All facts and plans are to be revealed to the union committee, and its understanding and consent must be obtained at every step.
5. The status of the union must be made secure. It must have the power to carry out its rules and regulations among all the employees of the firm.

This quotation from the pamphlet expresses the position of the union on cost reduction. The ideas expressed have been put into effect in a considerable number of plants throughout the country, some employing as many as a thousand or more workmen. And gains for management have been enormous. So I am not talking

about a dream, but something that is practical and that has worked.

I should like to quote for you a part of a report on its success in a large steel mill which was on the verge of bankruptcy when the union committee proposed this joint undertaking. This report was made by one of the workers participating in the study.

Dozens of suggestions have been submitted to the Company by our research committee. Many of these have been placed in operation and have resulted in reduced costs of production, and at the same time have improved our product. In many cases it has been very difficult accurately to measure the results; but the following cases where results are tangible and measurable illustrate our success.

The entire Research Committee suggested that pebble lime be substituted for Scioto lime in the furnaces of the Open Hearth. We maintained that pebble lime would bring sulphur down, reduce fuel cost, and increase tonnage. The superintendent vetoed the suggestion. . . . The president overruled him after the suggestion was pressed at subsequent meetings. The results of one week of experimenting showed that fuel consumption was down three gallons per ton; sulphur was down; and production was up. . . . On the fuel cost alone, a saving of \$6,800 a year was made.

After a thorough survey by a firm of combustion engineers, it was agreed that our gas consumption could be reduced in the Soaking Pit Department by installing checker chambers in the pits. A low bid of \$33,000 was made by an outside concern, which also guaranteed a 10 per cent saving. . . . A member of the Research Committee claimed that he could effect a greater saving with little or no investment. Management treated this claim pretty much as a joke; and those who had succeeded in securing the necessary appropriation for the renovation attempted to ridicule his suggestion. Although we succeeded in reaching the president with our suggestion, he was disinclined to accept it. Notwithstanding all this opposition, we pressed on; and when the chief engineer studied the suggestion, he at once insisted that it be tried. It was used on one block of pits and its success was immediate. It worked better than anticipated. It was installed in all the other pits at a total cost of \$900, and it has induced a gas saving of 15 per cent which means about \$18,000 a year, plus \$32,100 saved on equipment.

This is but part of the report, but gives an indication of the work done by the committee. Suggestions for improvement of productive efficiency in the cold rolling department, the bar mills, the shear department, the hot mill, and elsewhere were given by the research committee and adopted. One problem had been bothering the company since 1935, but the union committee was able to solve it. And I might add that an outside metallurgist, paid a fee of \$500 a day, had failed to find the solution prior to the inauguration of union-management co-operation. At the end of the first year, the company spent some \$6,900 for new equipment, but saved \$173,-

100 as a result of suggestions sponsored by the union's research committee—a net gain of \$166,200. And these accomplishments have been substantiated by a letter from the president of the company in question.

This program has been carried out in a number of companies with the same success. And it can be done elsewhere.

Advantages of Joint Research

The advantages of such joint research for cost reduction are obvious. The committee enjoys the full confidence of both the workers and the management. They are democratically elected and enjoy the freedom of suggestion thereby permitted. And most important, the workers themselves have no reason to fear that the company will take advantage of them. They know their honest interests will be protected. And this matter of security and protection brings me to one of the most important aspects of such co-operation, and that is the matter of union recognition. Such research and co-operation are impossible unless there is collective bargaining and unless the status of the union is secure. The individual worker has no protection and does not care to co-operate in a venture which may cost him or his fellow workers more than they gain. If the union is recognized only tentatively, or if the working force is divided into union and non-union, or if management still actively or subtly opposes the union, then the plan cannot work. The union committee will not have full power of action, and the workers themselves will not be willing to put their faith in management. It would seem that any management would be glad to do this in

return for the gains of union-management co-operation, but I know of one plant which refused. And the union here had presented a program which would save the plant better than \$30,000 the first year. Why the company refused this is something for proponents of scientific management to think about.

Perhaps at this point it would be in order to observe that while management has been devising all sorts of aptitude and psychological tests for employees, some agency should be established periodically to psychoanalyze management officials who sometimes in their genius for handling the complicated neglect or disparage the obvious.

Thus I have attempted to sketch, briefly, labor's attitudes and position in regard to cost reduction. I think it is something for all of us to bear in mind in considering technological changes and their effect on costs. You will have to keep labor's position in mind in the matter of such changes. We can't afford the social havoc created by the indiscriminate, unplanned introduction of technology. This mistake has cost us too much in the past, and is increasing.

And secondly those interested in scientific management cannot afford to waste the greatest natural resource of this country—the combined ability and knowledge of our workers—by not co-operating with labor in improving productive efficiency and in sharing the fruits of such efforts equitably.

Unless this is done, scientific management certainly has no right to use the word "science" in connection with its program, and the cost of "cost reductions" will far outweigh the benefits.

Mark your calendar Now!

December 5 and 6, 1940

New York

ANNUAL CONFERENCE

The Society for the Advancement of Management

Structure of Annual Wage Plans¹

Elements of Success or Failure

By F. BEATRICE BROWER

Management Research Division, National Industrial Conference Board, Inc.

BECAUSE unemployment and layoffs have been so serious a problem in our economic life during the past decade, the workers crave security of employment above all else. Confidence in steady employment also is essential to the normal spending and saving habits of the average person. That many companies recognize this need is evident from the increased interest in employment stabilization programs and from the number of the annual wage plans which have been adopted since the upward turn of business following the depression of the early thirties.

The annual wage plans are of comparatively recent origin. According to a recent study of The Conference Board, the first plan of this kind was adopted by the Columbia Conserve Company in 1917. The motive underlying these plans undoubtedly is the desire to assure employees a steady income and, at the same time, to increase their productive efficiency.

The income or employment security plans of thirty companies form the basis of this discussion. Information on the experience with these job assurance programs was secured in connection with a study of employment stabilization measures of American industry which I recently completed for The Conference Board and which will be published in August, 1940.

These security programs, however, cover a variety of approaches to the problem of assuring the wage earner a minimum yearly income. We must, therefore, be careful to differentiate between the different types. I have divided the plans studied into four classifications. In the first group are included those which might be designated as true annual wage arrangements. In this type the company guarantees regular employment for a specified number of weeks throughout the year. Seventeen companies now have such employment guarantees in force. The second group estimates the labor costs for the year and pays this amount out in fifty-two weekly installments, whether the employee is working or not. Two interesting plans, which will be discussed

later, belong in this category. In the third group are schemes which have been designated wage advance plans, of which there are five. They permit the eligible employee to draw against his future earnings for sufficient amounts to bring up his current income to a specified percentage of his normal earnings, these advances to be repaid in work and not in money. The fourth group, which includes six plans, provides income security for limited periods of weeks or months, but not for the year.

Guaranteed Annual Employment

I shall now discuss the details of plans in the first classification, namely employment-guarantee arrangements. The Procter and Gamble Company is a pioneer in this field, and its plan, adopted in 1923, is the best known example of this type. To employees with two years' service it guarantees forty-eight weeks' work of forty hours each, less time lost by holidays, disability, voluntary absence and emergencies. The McCormick Company gives forty-eight weeks of forty hours each. The Berkshire Knitting Mills guarantees certain classes of workers fifty weeks of work of forty hours each. The Welsh Company guarantees workers with one year's service 1800 hours per year.

The annual wage plan of the Columbia Conserve Company is interesting because it marks one of the earliest experiments in this direction. Back in 1917 the employees were given exclusive control over the management of the company and among the first steps taken by these worker-managers was to pay the permanent employees on an annual basis. In return, employees were expected to perform any tasks requested of them. With the advent of the depression, the company began to run into difficulties, as it could not possibly pay the annual wage bill which was based on 1929 business prosperity. Wages were gradually reduced, but with much bitterness and heartbreak; for the owner-workers thought of themselves as employees and not as owners sharing the losses in a period of drastic curtailment.

Four mercantile establishments have adopted plans

¹ Address before the joint meeting of the Production and Distribution Sections of the New York Chapter, The Society for the Advancement of Management, April 4, 1940.

guaranteeing employment to all or part of their employees. Sears, Roebuck and Company has been experimenting for several years with such a policy but has not as yet devised a plan suitable for all operating units. It has also been handicapped by some obsolete state wage payment laws with which its plan is in apparent conflict.

This company is experimenting simultaneously with two types of plans. One is based upon a constant work-week guarantee for a basic organization of regular employees which represents about half of the force and excludes part-time and temporary workers. The other is a variable work program, which guarantees a full pay check equivalent to the basic standard hours regardless of the hours worked; but an employee may be released for reduction in force. If an employee accumulates a deficit of unearned hours he is expected to make it up from future overtime. One plan tried out by the company provided for the deduction of a portion of the overtime which was to be applied against future deficits in hours. This project was abandoned when the Wage Hour Administrator ruled this policy out, because the law says that the employer may not hold any wages back.

When the legal work week is dropped to forty hours next October, it is feared that the time and one-half overtime penalty may be prohibitive.

Commission salesmen who desire may leave with the company 50 per cent of their earnings above a week's drawing account, to a maximum of four weeks. This reserve, which is built up during the busy season, is used to apply against deficits in the dull season. If deficits do not develop, such reserves are paid off once a year with interest.

Another mail-order house, Spiegel, Inc., has adopted a year-round employment guarantee plan which applies to all permanent employees. Because women are not permitted by state law to work as long hours as men, the guarantee for the former class is thirty-six hours per week and forty for the latter. Whenever the company cannot furnish eligible employees with a full week's work it gives a cash advance for the difference. This advance can only be repaid in work, and should any advances be outstanding at the end of the year, they are cancelled, so that the employee faces the new year with a clean slate.

The Namm Store in Brooklyn for some time studied the problem of employment stability and found that it was possible to give its basic force an employment guarantee, ranging from forty weeks per year for its work-

ers with one year's service to fifty-two weeks for its members with over five years' service. This plan does not include contingents or per diem employees.

These are the better known employment-guarantee plans. There are a few small companies with such plans which I shall not discuss. These assurances of full-time employment are practical only in case a reasonably steady rate of production or constant consumer demand can be achieved. It is significant that all but two of the seventeen guaranteed employment plans are in the consumer goods industry and eight of the seventeen are in either food companies or in mercantile establishments.

For an employment guarantee plan to succeed, sales, production and personnel must be carefully co-ordinated in order to assure the highest possible degree of employment stability. I am afraid, however, that a number of these plans, especially in the small companies, were initiated without giving careful consideration to all the factors involved and weighing all the consequences should the company experience serious depressional unemployment. Six companies had incorporated such provisions in the union agreement at the request of the unions. Another company inaugurated the plan to forestall unionization. If a sharp and prolonged depression occurs, such plans, based as they are on so shaky a foundation, will not survive. One of these companies is already beginning to experience difficulties. Recently an official of this concern wrote us:

We discovered that such a work guarantee is apt to prove embarrassing to management at times when business is generally declining or when it concerns specialties which are affected by seasonal changes.

In the light of the experience gained during the past few years we intend to modify our contract, reducing the work guarantee from 50 weeks to 36 or 40 weeks in some instances.

McCormick and Company has stabilized employment in a novel manner. Mr. McCormick, the President, calls it a multiple skill and universal transfer plan. By means of this plan, the company has been enabled to give its employees a forty-hour week for forty-eight weeks per year. The foundation of the company's program is its willingness to transfer employees across department lines.²

In hiring new employees, a definite attempt is made to select persons who are of sufficiently high calibre to learn a multiplicity of skills and who appear to be prom-

² For a full description of this plan see "Multiple Management" by Charles P. McCormick, *The Society for the Advancement of Management Journal*, January, 1938, Volume III, No. 1, pages 36-39.

ising material for promotion. As a consequence, an operator in the tea packing line may be transferred to the office to fill in during periods of increased activity and after the rush is over be sent to a local store to demonstrate the company's products. Promising and alert production men have been transformed into salesmen during slack periods, with excellent results. Management is on the continual lookout for suitable products to fill in during the seasonally dull period.

The Annual Wage in Weekly Installments

There are two plans which probably do not belong in the true employment guarantee classification, yet they do provide wages throughout the year. They pay out the annual labor cost in fifty-two weekly installments. Both of these are well-known; they are the George A. Hormel and Company Straight-Time Arrangement and the Nunn-Bush 52 Paychecks-per-Year Plan.

George A. Hormel and Company is primarily a meat packing house, but it has greatly diversified its line in recent years. Because of its dependence on agriculture, meat packing has always experienced extremely sharp fluctuations in employment. It is possible, however, to forecast fairly accurately the number of hours of labor required annually to produce the estimated yearly volume, under normal conditions. Instead of paying the workers on the basis of work actually performed each week, the Hormel Company conceived the idea of estimating the total hours of work required per year to produce the budgeted annual volume and paying it out in fifty-two uniform weekly installments, regardless of the number of hours worked in any particular week. This is particularly important in meat packing, where shipments are so irregular. In return, the employees were expected to work as many hours as necessary to turn out the production scheduled, up to a maximum of fifty-three hours during peak periods.

The plan originally provided that the workers in a department were individually and collectively indebted to the company for the balance of unworked hours if, at the end of the year, a department produced less than the budgeted annual volume, and were expected to make up the deficit at the first opportunity. Soon after the plan became effective, the mid-west suffered a major catastrophe. For two years, this section was ravaged by the most terrible droughts in the history of the country, and, in consequence, the receipt of live stock at the Hormel Company dropped far below the estimates. Many times during these two summers, workers in

some departments finished their tasks and went home at ten or eleven o'clock in the morning. As a result of the drought, employees in several departments piled up huge deficits of hours paid for but not worked. Four years later, some of this time still stood as a charge and had not been completely paid in work.

Recently the "make-up" provisions of the plan were dropped, as it was felt that this was a burden which should not be imposed upon the employees. The company is protected to some extent against the payment of a disproportionately large number of unproductive hours during a cyclical decline in business because the earnings are based upon an estimated volume of production somewhat below normal.

To forestall criticism that the company was using the plan for the purpose of obtaining more work than was paid for or of speeding up production, management created a system of year-end bonuses for production in excess of planned volume, the method of determination of bonus payments being individually fitted to the conditions within each department. The standards are fixed sufficiently low so that even normal volume provides a year-end bonus for additional production. The average wage is approximately \$1500 per year or \$30.00 a week.

The straight-time arrangement has been a great stimulus to the company to provide steady work for its employees. I recently heard Mr. Hormel say that when there was no other work to do, a group of employees, under the supervision of a carpenter, erected thirty-three houses in the community. This speaks well of the versatility of the employees. The company at one time canned beef for the government. When the contract was completed, they had a group of employees for whom they felt they must find work. They created a beef dish which was named Dinty Moore Beef Stew. This was packed in the same size can as the government meat. The first year a substantial loss was suffered on this product, the second year they were not so far in the red, the third year they broke even. Now the stew has so caught the public's fancy that they are opening another plant for the manufacture of this particular brand.

From the workers' standpoint, the advantage of the plan is self-evident; security of income on a yearly basis. A small fraction of the working force was able to earn approximately one hundred hours' additional pay per year under the former system and were somewhat dissatisfied until the advantages of a regular pay check of uniform amount became apparent. The majority of the workers are enthusiastic about the plan, not

only because of the security it affords, but also because they are earning a somewhat higher wage.

I have discussed the Hormel plan in considerable detail, as it is by far the most interesting of these annual wage arrangements.

Under the Nunn-Bush Company plan, the procedure is somewhat similar. The company makes an annual contract with its permanent employees to pay into a group salary fund 20 per cent of the wholesale value of all shoes produced. On the basis of the company's forecast of the probable volume of business, a system of drawing accounts is set up. The individual's rate is computed by multiplying the hourly rate assigned to him by the estimated number of working hours during the year, and then dividing by fifty-two. If production falls below the estimate, pay checks are scaled down, whereas if it exceeds the amount forecast, the excess funds are distributed pro rata at the end of the year.

Eligibility is restricted to permanent employees. Should it become necessary to hire extra workers, these temporary employees may not become eligible until this group totals from 10 per cent to 15 per cent of the permanent force, or until it becomes apparent that the normal growth of the company justifies an increased personnel. An important part of the company's stabilization program is the control that the company has been able to exercise over its retail sales by setting up its own stores.

Wage-Advance Plans

We now come to the discussion of the third group, which I have designated as wage-advance plans and which Professor Balderston likes to call "drawing accounts." Of these five plans, one is in the linoleum industry, one in the chemicals, two in the automobile industry and one in lumber.

Most of these wage-advance plans are similar in pattern to that of the General Motors Corporation and I shall describe that plan to indicate the type of plans in this classification.

The General Motors Corporation adopted an income security plan for the year 1939 and continued it for 1940 with some revisions shown to be desirable in the light of the previous year's experience. The wage-advance provisions of the plan were limited to employees with five years' service. The company set up for each individual a credit equivalent to 360 hours' pay at his latest hourly rate, less any advances made in 1939 which had not been repaid. Whenever actual earnings fall below 60 per cent of the standard earnings, the employee

may request an advance from this credit sufficient to bring up his income to twenty-four hours (or 60 per cent) of his standard earnings, less any benefits under the Unemployment Compensation Law. Whenever earnings increase above 60 per cent, half of the employee's earnings in excess of this amount are applied toward the repayment of the loan. These loans are not repayable in money but are compensation for services to be rendered in the future.

The 1940 plan differs from that of 1939 in three important aspects. Previously the plan permitted employees with five years' service to borrow against future earnings for an unlimited number of hours during the year. The 1940 plan restricted these employees' advances to 360 hours, and this total was to include hours advanced in 1939 still unpaid. It also provides that any advance not repaid within three years shall be automatically cancelled. It also excludes employees past sixty-five years of age from participation because they are eligible for federal old-age benefits.

A lay-off bonus of seventy-two hours' pay has also been established for each employee with two but less than five years' service.

The plan of the Armstrong Cork Company is similar to the General Motors Plan before its revision. It guarantees a minimum of twenty-four hours per week throughout the year to employees with five years' service and contains some guarantee of hourly rates for employees with one year's service; advances to be repaid in work.

The Davidson Chemical Company advances employees with three years' service the difference between actual earnings and thirty hours, less unemployment compensation; but the advance is limited to a maximum of 175 hours, repayments to be made out of half of earnings above thirty per week.

The limitations of these wage-advance plans must be taken into account with the merits. They may be a step forward in that they give some added stability of income to individuals. To the extent that they meet short emergencies they may be justified.

An important criticism, however, might be directed at the loan feature of some of these plans, for if these wage advances are given over an extended period they may mortgage the employee's future earnings to a point where he is induced to leave to escape payment. Finally, if these plans are extended beyond relatively low guarantees of twenty-four hours' pay and are not confined to long-service employees they may represent a heavy financial burden for the company.

These factors may, in part, be responsible for the vital revisions made to the General Motors Corporation's plan, mentioned above.

One company met with unexpected obstruction to the proper functioning of its wage advance plan in the opposition of the union members in the belief that the plan was to be used as a wedge to alienate employees from the union. This objective was farthest from the company's intention, but the opposition of the workers was so outspoken and so few employees requested advances that the plan was suspended after one year's operation.

Short-Term Plans

We now come to the fourth classification of income security plans which, in a strict interpretation of the term "annual wage" do not belong in a discussion of this topic; nevertheless they do furnish employees with a greater degree of employment stability than they would otherwise enjoy. These plans provide for security of income over a relatively short time. The plan of the William Wrigley, Jr., Company provides eligible workers with a standard week of thirty-five hours as long as employed, and a lay-off benefit of from sixteen to twenty-eight weeks, depending upon length of service.

A significant new development is the utilization of a portion of the company's profits to supplement the employees' earnings during periods of reduced operation. A plan which has attracted widespread attention recently is the Security Wage Plan of Oneida, Ltd., which is based upon profits. For many years the Oneida company has been studying the problem of employment continuity. In the beginning, it had a real problem to contend with, as the bulk of its silverware was sold during the Christmas holidays. Through production control, aggressive sales campaigns, the creation of a cheaper plate which could be used as premiums, and the extension of its market to include restaurants and hotels, it has been able appreciably to smooth out the peaks and valleys of employment.

On February 20, 1940, the company announced that it was distributing a profit-sharing bonus equivalent to one week's pay to each employee in cash, and, in addition, would give a bonus of forty hours' pay. If the workers leave this bonus in the Security Wage Savings Account, the firm contributes an additional thirty-two hours' pay for employment up to five years and forty hours for employment five years and over. In addition, overtime above forty-four hours is put into the security fund until a maximum individual reserve of 120 hours is

reached. When an employee works less than thirty-six hours in any week, sufficient benefits are drawn from the fund to bring the worker's paycheck up to the amount he would normally receive if he had worked a full forty hours, until the fund to his credit is exhausted. Employment has been so stabilized that the company believes this will provide the employee an annual income. In the event of an employee leaving the company, all contributions are returned in cash.

There is also the new plan of the International Harvester Company. It combines income security, savings, profit sharing and pensions in one cover-all plan. Its chief provisions are as follows:

An individual account will be created for every employee who participates, in which he may deposit up to 10 per cent of his wages or salary, the company to match half of his savings up to a maximum of 2.5 per cent of income. To these reserves are added a quarter of the profits above \$3.00 per share on common stock. Employees with three years' service or over only are eligible to participate in the company's contributions. With certain exceptions, the employees forfeit the company contribution if they withdraw their own savings. The individual's reserves are to be used to supplement the employee's earnings whenever they fall below 60 per cent of his normal full-time earnings, in which event he may withdraw funds from his account to bring up his income to the 60 per cent mark. When an employee retires, he will receive the entire amount to his credit, usually in the form of an annuity.

Prevalence of Income Assurance Plans

The question uppermost in your minds, I am sure, is how many of these annual wage plans are there? While I cannot say with certainty that we have secured information on all plans in operation, I am sure that we have received information on most. As I told you, the analysis was based upon thirty plans. In our recent census study, published in February, 1940, the prevalence of certain personnel activities was analyzed.³ This survey covered 2,216 manufacturing concerns, of which fourteen, or 0.6 per cent, reported that they had annual wage plans, and twenty-eight, or 1.3 per cent reported guaranteed employment plans. This makes a total of only forty-two plans in a large sampling. Employment in the thirty companies with income or wage assurance plans which have been discussed is in the neighborhood

³ National Industrial Conference Board, "Personnel Activities in American Business," *Studies in Personnel Policy* No. 20, 1940, page 23.

of 350,000. Most of this employment is concentrated in three large companies. If we deduct the employment of these three, the number in the remaining twenty-seven is in the neighborhood of 22,000 persons, indicating that some of these concerns are quite small.

Elements of Success or Failure

Annual wage plans that guarantee full-time employment will not be adopted widely because the number of companies that can really afford to make such guarantees is small. Employment guarantee plans, in themselves, will not stabilize employment. While an employer may provide his employees with work or income when his business does not warrant it, he can continue to do so only for a limited time.

There are a number of safety factors in nearly all these plans. They are generally restricted to employees with a number of years' service, the employment guarantee applies to less than fifty-two weeks during the year, or the guarantee covers only a certain percentage of the worker's pay. As Mr. Folsom of the Eastman Kodak Company pointed out in a recent *Management Record of The Conference Board*,⁴ if the restrictions are too great, the plans will provide little in the way of actual benefit to the employees, because the workers who are given assurance are the ones who have steady employment and probably are not worried about their jobs. Few companies could afford to apply the guarantee to all workers except in an industry with little seasonal fluctuation, or in which work had been well stabilized beforehand.

On the other hand, the presence of such a guarantee may have a favorable psychological effect not only upon the older employees, but also on the short-service employees who hope, at some future date, to enjoy the employment security the plan offers. Probably the chief benefit of these plans is that they will stimulate management to study intensively the problem of stabilizing employment. In a recent round table held by The Conference Board the fact was repeatedly stressed that an annual wage plan could only be successful in a dynamic organization which was continuously seeking new products to fill in the gaps and stimulating consumer demands for its products. Obviously such a plan could not function in a company that was on the down grade.

The Fair Labor Standards Act has raised serious questions regarding the operation of some of these plans which balance undertime against overtime. Section 7

(b) (2) provides for exemption from the overtime provisions of the Act up to a maximum of twelve hours per day and fifty-six hours per week if an annual wage contract is made with a union certified by the National Labor Relations Board, and provided that the workers are not employed more than 2,000 hours during the year. It is significant, however, that so far only four such contracts have been filed, of which three cover only highly paid printers in the textile mills. The fourth concern is George A. Hormel and Company.

Another vital factor to be considered is the experience with plans existing prior to the depression. A bulletin of the United States Bureau of Labor Statistics in 1931 listed fifteen company plans providing for some type of income security. All these plans, with the exception of the Procter and Gamble Company and the Columbia Conserve Company, have fallen victims to the depression and the Federal Social Security Act. The active plans included in the present survey, with these two exceptions, were established since 1934 and have yet to be tested by a major catastrophe such as the depression of the early thirties.

One interesting factor is the changing character of these income security plans. At first the emphasis was upon the employment guarantee type. Next we have the rise of the wage-advance type, following the example of the General Motors Corporation. We now seem to be entering an era of a more restricted guarantee of employment which may, in some manner, be linked up with profits, although there still are not many of this type in force.

Obviously, the adoption of an annual wage plan imposes heavy administrative and financial responsibilities which management hesitates to assume. However, management has become increasingly conscious of the advantages of employment stability, both from the standpoint of the company and the worker. The merit-rating provisions which have been incorporated in many state unemployment compensation laws especially have greatly stimulated management to reduce layoffs. In connection with my present study of employment stabilization, I found a number of companies which had gone to surprising lengths to provide steady employment for their workers. Many had been giving year-round employment over a period of years and probably could give a guarantee of employment with safety. For understandable reasons, however, these concerns hesitated to give a guarantee of employment to specific workers.

It is my opinion, however, that this skepticism is a

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⁴ Folsom, M. B., "Stabilization of Employment and Income," *The Conference Board Management Record*, February, 1939, page 18.

Economics for Industrial Engineers¹

By GEORGE D. WILKINSON, JR.

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EVERY thoughtful industrial engineer gives attention, at some time in his career, to the social implications of his work. If he has a tendency to ignore the subject in the enthusiasm of doing a job well, the continual criticism leveled at him by his socially minded contemporaries and by the workers whose jobs he imperils goads him to take steps to justify himself. A naive example of this reaction is his vigorous assertion that he is not an "efficiency man." He has a comfortable feeling that if he can only separate this odious term from his profession, he will once more establish himself as a respectable, constructive member of society. Some engineers, realizing that the solution of the dilemma must go far deeper, have attempted to formulate an economic and social philosophy that will reveal the constructive side of their work.

Although this effort in itself is praiseworthy, too many engineers have approached the problem in much the same frame of mind as those who seek to erase the pernicious term of "efficiency man" from the public memory. Far from building their thoughts upon a study of the present-day working world in which they find themselves, they have tried to construct a social credo upon a combination of outmoded economic dogmas and unmitigated wishful thinking. The purpose of this paper is not to propose a complete social and economic philosophy, but rather to examine critically one of the most common of the expressions proposed by industrial engineers. Stated simply, this expression can be summed up as follows: "The greater efficiency which results from our work means lower prices for the products we are making. The lower prices make it possible for more people to buy our goods, and the increased sales make it necessary for us not only to keep all of our present workers, but to employ even more."

A critical analysis of this theory prompts four questions, which must be answered completely in the affirmative if its validity is to be unquestionably established:

1. Is the productivity of the worker increasing? If the answer is "yes," then,

2. Are prices going down because of the increasing productivity?

3. Are more goods being sold as a result?

4. Are enough more being sold to re-employ all of those workers who are made unnecessary because of technological developments?

In this paper, current economic and business statistics will be cited in an attempt to arrive at answers to these questions. The intention of the author is to show that no unqualified affirmative can be given to the last three of the above questions, and that the entire theory must, therefore, be subjected to a thorough revision before it is in accord with the real economic situation.

Productivity of the Worker

The answer to the first question is the easiest. Few people would contend that the worker today is not producing more per labor hour than at any time in the past. A survey of fifty-nine manufacturing industries made by a national research project and published in 1939 reports that the worker in 1919 had an output per man hour of only 69.1 per cent of the worker output in 1929, and that by 1936 this productivity had increased 23.9 per cent over the 1929 level. Engineers need not turn to the economists for data of this sort. In the Transactions of The American Society of Mechanical Engineers for 1939, Alford and Hannum reported the productivity of fifty manufacturing industries, comparing performance during the period from 1923 to 1931. They found that the number of workers required to produce the output of 1923 decreased from 67,824 in 1923 to 58,211 in 1931. Putting it another way, to produce as many goods in 1931 as were produced in 1923, and at the same time to employ as many people, the work week would have to be decreased from 51.2 hours to 35.4 hours. Other data could be cited to support this point, but there is no need to labor the obvious.

Prices

Are prices going down as a result of this increasing productivity? Here the answer is not clear-cut. Exam-

¹ Paper presented at a meeting of the Time and Motion Study Group, Metropolitan Section, The American Society of Mechanical Engineers, January 18, 1940.

ples of both increasing and decreasing prices are readily obtainable. The automobile retailed at an average figure of \$1,115 in 1914, according to the Automobile Manufacturers' Association. In 1938, the average car cost \$783. In the same period of time, electric light bulbs decreased in price from sixty-three cents to fourteen cents. Electric fans sold for \$12.20 in 1914; for \$2.75 in 1938. In 1921, when rayon was still in its infancy, it sold for \$2.69 a pound. Since that time, with very few exceptions, it has sold at a steadily decreasing price, until in 1939 it sold for \$.51, less than one-fifth of its price two decades ago.

There are endless examples of falling prices as a result of the engineer's work, but the numerous examples of goods which now sell at the same or higher prices, even though many technical developments have taken place in the industry, must not be ignored. The automobile has already been mentioned as a product whose price has fallen. Between 1914 and 1938, the two years for which prices were quoted, almost a quarter of a century elapsed. Most of the fall in automobile prices occurred during the early part of that time. In 1929, a period of high prices, the average f.o.b. price of a car was \$773.00. By 1933 this price had fallen to \$671.00, but prices in general had fallen during that time by about 30 per cent, so that automobile prices, relative to general prices, had actually risen. By 1937 the average price had risen to \$717.00. Although the automobile industry has been in the forefront in technical development, lower prices have not been a result during the past decade.

Drugs and toilet articles, which cost \$1.00 in 1914, cost \$1.41 in 1938. Tobacco which could be bought for \$1.00 in 1914 now costs \$1.12. A year's supply of clothing for a family of four during the same time has increased in cost from \$175 to \$218. An article in the *New York Times* for January 2, 1940, told an interesting story about steel. It explained that the steel industry had just completed an enormous reconstruction program costing millions of dollars. High-speed rolling mills and similar engineering developments had been built into the industry. Naturally, one would expect that such improvements would result in lower prices. To quote the article: "So far as can be judged by the experience of recent years, the customers of the steel industry have been the principal beneficiaries of the reconstruction program that has been effected, as they may purchase a wider range of products, of better quality, at *1929 Prices.*" (italics ours.) In spite of all other progress, in spite of a wider range of products and of better

quality, the technical advances of the past ten years have not seen lower steel prices.

The answer to the second question, "Are prices going down?" is, then, both yes and no. Where prices are going down, their decline in many cases can be traced almost directly to improvements wrought by engineers. Other prices, in spite of technical improvements, have not declined, and many have increased. The reason for the failure of some prices to respond to technical improvements will be treated later in this article. The important point here is that technical improvements do not necessarily lower prices.

Sales

Are more goods being sold because of decreased prices? Many homely examples belie the theory that because the price goes down, more goods are bought. During the past few years, the price of bread has decreased from thirteen cents to ten cents a loaf. How many people have increased their consumption of bread as a result? If the price of toothpaste were cut in half, would individuals use twice as much? Many articles which are bought and used habitually would scarcely find greater use if their prices were decreased.

On the other hand, many commodities behave in exactly the opposite manner. The sale of electric light bulbs has increased steadily as prices have decreased. The fall in the price of automobiles was accompanied by a corresponding increase in sales. It is interesting to note that the rapid increases in automobile sales stopped at about the same time that automobile prices stopped declining. Rayon, whose price history has already been mentioned, has enjoyed a steady rise in sales. Actual statistics to answer the question are difficult if not impossible to get, because sales are influenced by many factors other than price. Style changes and population trends often have greater bearing upon sales volume than have prices alone. From a consideration of the foregoing examples, however, it seems evident that this question, like the preceding one, cannot be answered with a simple "yes" or "no." The sales volume of some commodities will increase if the prices are lowered. For many other commodities, a change in price will have relatively little effect.

Technological Unemployment

Are enough more commodities being sold to reabsorb those workers who would otherwise be displaced by

technical improvements? To state it more accurately, do the sales of those commodities responsive to price changes increase as fast as the productivity of the workers increases? Again no definite answer can be given. In the rayon industry, between 1929 and 1937, productivity increased 141 per cent. Prices fell, and sales volume increased by 181 per cent. The increase in sales was enough to offset the increase in productivity, and the result was an increase in man hours worked of 16.6 per cent, and of employment of 48.3 per cent. On the other hand, automobile production was only 85.3 per cent of its 1929 level in 1936, and the number of man hours had fallen off, in the same period, to 73.7 per cent. In the glass industry production increased 16 per cent while man hours worked decreased 28.5 per cent and employment decreased 3.2 per cent. Thus, decreases in price and increases in sales volume do not always result in the employment of more people.

Increasing Unemployment

To stay within the scope of this paper, many important factors in the current economic situation must be disregarded. Yet the fact remains that, since the productivity of the worker is constantly increasing, one or more of the following events must take place if the economy is to function properly:

- a. hours of work must decrease
- b. wages must increase
- c. prices must go down so that purchasers can buy more either of the same commodity or of some other commodity.

All these mitigating events have appeared to some extent. The work week has decreased from seventy-two hours to forty in most industries. Many concerns, in a valiant effort to keep as many people as possible employed during the depression years, reduced their work weeks much further, but this action cannot be considered normal. Wages are increasing. Although much credit for this fact must be given to greater union activities, the trend toward higher wages was established before the C.I.O. came into existence. The doctrine of high wages and low labor costs, formulated by Frederick W. Taylor, has for years been the guiding principle of progressive industrialists in this country. The National Industrial Conference Board is quoted as saying that the hourly wage of the factory worker increased from \$.25 in 1914 to \$.71 in 1938. Weekly earnings increased from \$12.68 to \$26.03 during this

period, although hours of work declined from 51.5 to 36.6 hours per week. The doctrine of high wages and shorter hours has not found universal acceptance, however, and many examples can be cited of wages being increased and hours decreased only under the severest compulsion.

In regard to prices, we have already seen that increases in productivity are not always accompanied by decreased prices. An important reason may be that technical changes resulting in greater productivity may occur in the face of increased costs to the industry. Rising prices of wool accounted for increased prices for clothing even when labor costs were decreasing. Real factors in this situation today are increases in wages because of union activity, and higher taxes. Many industries, faced by rising costs in these fields, are forced to improve their technical processes, not to decrease prices, but to maintain them at their present levels. At times improvements are made while the volume of business is decreasing, so that lower labor costs are absorbed by the necessity of distributing the overhead over a smaller number of products. The same effect is obtained if a new plant embodying the latest technical devices is built in anticipation of an expansion of business that does not materialize. Much of the failure of steel prices to reflect technical improvements can probably be attributed to this cause. Very often technical improvements mean a better product, but not a cheaper price. Automobiles, for example, have been the object of many improvements during the past several years. Although these technical advances mean a better car for the money, they cannot be expected to increase the sales of cars or to provide greater employment, because the price has not decreased. Another reason why prices do not fall is the fact that much technical effort is wasted in preserving the competitive position of the individual companies that make up our economy. A saving of thousands of dollars by an engineer in the operating department of an enterprise may be absorbed by an additional expenditure of a like amount for the services of a comedian to persuade radio audiences to switch their purchases from a competitor. Finally, prices are often not responsive to technical changes because the industry may be under some degree of monopoly control. Habitual prices, price-fixing agreements, or patent controls may make it possible for industries to charge a price far in excess of the real cost of production.

To some degree, then, hours of work have decreased, wages have increased, and prices have fallen. Yet according to the best available data the number of people

unemployed in this country has been steadily increasing during the past several decades. Although no accurate statistics on the number of unemployed in this country were available until 1937, when the census of unemployment was taken, the various estimates tend to bear out the same fact. The following table is one such estimate, showing that every period of prosperity is accompanied by a larger number of unemployed than the preceding period.

TABLE 1.—THE UPWARD TREND OF UNEMPLOYMENT, 1900-33

Years	Character of Period	Yearly Average of Workers Unemployed	Per Cent of Workers Unemployed
1900-06	Prosperity	657,000	7.6%
1907-09	Depression	1,091,000	10.7%
1910-13	Prosperity	877,000	7.9%
1914-15	Depression	1,860,000	15.9%
1916-20	Prosperity	817,000	6.4%
1921-22	Depression	2,625,000	20.7%
1923-26	Prosperity	1,149,000	9.0%
1927-29	Prosperity	1,250,000	9.5%
1929-33	Depression	5,400,000	35.2%

Source: "The Decline of American Capitalism," Lewis Corey, Covici-Friede, Inc., 1934, page 242.

Conclusions

An attempt can now be made to answer the initial question of this paper: How can the industrial engineer justify his work in the face of the economic and social maladjustments which often seem to follow in his wake? Many of the favorite theories that industrial engineers use to remove the disgrace of their calling in the eyes of the world have been seriously questioned in this paper. It seems to the writer that most of these theories have been based upon wishful thinking, and have not been substantiated by a comparison with facts. Engineers owe it to their profession to be honest with themselves.

What can an industrial engineer say to justify himself? The most obvious point he can make is that better methods raise the ceiling for wages. In the economic system in which we live a man cannot consistently receive more in wages than he contributes in services to his employer. Any firm which paid its workers more than they produced would soon be out of business. No matter how pressing may be the needs of the workers, and no matter how well they may be organized, they cannot expect to get more than they produce without bringing upon themselves ultimate ruin. The only way in which wages can be safely raised is by producing

more goods, and one of the best ways of doing this is to eliminate soldiering and waste motions.

A second point he can raise is that he is making it less and less possible for workers to be exploited, knowingly or unknowingly, by their employers. He is finding out by scientific methods how much work a man should be asked to do during a work day in the shop, and he is showing the worker how to do it most efficiently. This information makes it possible for management to treat its men with more honesty and fairness than it could when wages and tasks were determined by the whims of the supervisors.

A third argument is that the industrial engineer may act to offset other tendencies that would eliminate labor. Many cases could be cited in which the introduction of a labor-saving machine was under consideration and was prevented by the discovery of a more efficient way of doing the same task by hand. Labor has an advantage over the machine in that it is not a fixed overhead charge and industrial engineers can save many jobs for labor by finding better ways of working with the hands.

The final argument is not quite as academic as the others. The average worker does not care particularly if someone else is thrown out of work, so long as his own job is preserved. From this point of view, the industrial engineer has much to say. The products made in any plant are competing, not only with similar products made by other plants, but with every other commodity for which the consumer may spend his dollar. The radio is competing with the automobile, and the baker's pie with the druggist's ice cream. Brand A shoes are competing with Brand B shoes. Every plant must, therefore, keep itself in a favorable competitive position. This means that every worker must work in the most effective manner, so that the ultimate product can be sold at the cheapest possible price. Unless this is done, the orders will go to a competitor, the plant will fail, and the workers will be among the numbers of the unemployed.

All of the arguments up to this point may be used to justify the activities of the industrial engineer to the employes in the plant, but they very neatly avoid the real question that such engineers are asking themselves: How important are increased wages and decreased hours and prices, when unemployment is constantly increasing in spite of these factors?

In the face of such a question engineers can, if they choose, take refuge in the fact that the responsibility for

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Management Problems of Mobilization¹

By LEO M. CHERNE

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IT IS unfortunate that tomorrow's answer to the problem of large and small business lies outside the boundaries of this country. We as individuals can, to a large extent, control our national policy. But even as a unified people, we are impotent in the arena of international affairs.

If I were merely to express this pessimistic conclusion, I would not presume to take your time further. But no matter what the developments may be, we at The Research Institute function in the belief that business of any size and character can emerge with less loss or greater profit than its uninformed neighbor or competitor if its managerial brain understands the developments, can appraise the future with reasonable accuracy and knows what should or should not be done in the light of the facts.

The international problem is giving genuine concern to private observers as well as to official leaders in Washington. Yet, until recently, to no major problem was business devoting less thought and offering less resistance. Astigmatic business intelligence is rarely aroused by a future threat. It is awakened only by the actual existence of adverse legislation or circumstances. But war can be neither repealed nor declared unconstitutional. Some attention by individuals and associations must therefore be directed to the business problems of war. Neutrality, embargoes, armaments, war, war profits taxes, foreign policy and other similar government ventures are business problems. War and its concomitant, depression, affect private enterprise more widely if not more drastically than they affect private lives. The business man must not keep his eyes closed pending an actual declaration of war.

Among the most unfortunate business misconceptions is the idea that the executive can remain oblivious of the need to adjust his business to war until the country is actually engaged in it. Both the effect of today's events and the ostrich-like error of this attitude can be seen from the fact that:

(1) The plan for the mobilization of American industry has not only been completed by the War and

Navy Departments for years, but several phases of this plan are already in operation.

(2) The appointment of the National Defense Advisory Commission is the most dramatic hint to business that the co-ordination of the nation's economic resources is not merely an academic study.

(3) Most important of all, Section 120 of the National Defense Act empowers the President in time of war or when war is imminent (and he is the one to decide when war is imminent), through the head of any Government department, to place an order with any firm for any product or material that may be necessary.

Thus, when the President decides that war is imminent, your firm must not only comply with such orders, but the orders are to take precedence over any other business the firm may have. Where your business refuses to give this preference, this section gives the additional power to the Government to "take immediate possession of any such plant," and to subject the firm or any individual responsible for the failure to comply to a possible penal sentence of three years and fine up to \$50,000.

Business During This Peace

The extent to which business will be affected during the hectic period of such "peace" as we now enjoy is best realized from the fact that the national defense "shopping list" for items of war importance will require 7300 articles or processes of production from business. The War Department has already found potential production facilities in industry which in an emergency could produce almost 100 per cent of our war needs.

The immediate War Department program which involves everyday business activity can be summarized briefly as follows:

(1) Securing an adequate stock of strategic materials essential to national defense. This is still to be done.

(2) Establishing standard types and styles for all key items produced in various private plants and completion of the necessary drawings, specifications and manufacturing data for immediate use in case of emergency.

(3) Completion of the War Department's surveys of

¹ Paper presented at a meeting of the Boston Chapter of The Society for the Advancement of Management, October 26, 1939, and since revised.

the industrial capacity of private plants for all necessary wartime commodities. This process of allocation is largely completed, and it cuts directly across practically every peace-time productive activity. Hence, the need for appropriate plans to mobilize and control all economic resources of the country.

(4) Preparing the selected private plants for their war schedules by means of current orders, educational orders and production plans. A forty-two-million-dollar educational orders program to accomplish this was launched, although appropriations were later reduced.

As to the close connection between a European war and American business activity, nothing could have emphasized this relationship more than did the President's declaration in September, 1939 of a "limited" emergency for the purpose of enforcing domestic neutrality. The President's announcement of a "limited" emergency was so called in his press conference. In the official proclamation, however, it appeared as a full "national emergency" in connection with the observance of neutrality and the strengthening of national defenses. The use of the word "limited" in the President's phrase was designed to accomplish three objectives:

(1) To impress Americans with the fact that we are vitally affected by the present war without causing the immediate hysteria which would have resulted from the declaration of a full emergency.

(2) To accomplish certain national defense objectives for which there was no existing appropriation of funds.

(3) To prepare for the use of a "full emergency" if further governmental steps were considered necessary.

The declaration of a "limited" emergency, made under the executive power of the President, permitted him to exceed existing appropriations of Congress in stepping up the size of the Army, Navy and Marine Corps. As it became desirable to step up procurement of materials, supplies, and munitions for the increased military machine, the President had the power to accomplish those ends under the executive powers existing in the already-declared emergency. But when Germany stormed over the Low Countries and through France, Congress eagerly rushed to support the President's demands for military appropriations.

Section 120 of the National Defense Act provides power to prevent runaway prices, which might result from the new demands for goods that the Government must make on industry in a period of preparedness or war. Under the section, the President has the right to place compulsory orders for any merchandise and, if

necessary, to commandeer any plant suitable for manufacturing or producing the necessary commodities. If any industry proves recalcitrant, not only could plants be taken over by the Government, but the responsible executives could be fined or imprisoned. There is little fear of any substantial commandeering of plant and equipment, but the power thus given can be used to pull down the runaway price of any commodity, if the President or a designated agency places a compulsory order for that commodity at a lower price. While the President still has no right under Section 120 to control all prices, he can create the price levels for those sensitive commodities which are of importance to American industry and to consumers by threatening to use his extreme powers to commandeer.

These phases are emphasized because no one can tell when the President may decide that the full use of the power existing in the already declared national emergency is necessary, bringing those unprecedented forces in our economic life into play.

The Industrial Mobilization Plan

Former Assistant Secretary of War Louis Johnson, in his foreword to "Adjusting Your Business to War," has written: "Our Industrial Mobilization Plan attempts to anticipate the World War difficulties in any future war effort, with the minimum disruption to our peace-time methods and procedure, and with post-war readjustment given careful consideration."

Primarily, business must understand two facts:

(1) The plan is not new; it is not a "New Deal" accomplishment.

(2) The plan is the product of the joint efforts of the War and Navy Departments applied to the business problem since the close of the first World War. It is based upon one primary assumption—that if the United States enters a war, this war must be terminated as quickly and as successfully as possible.

During the first World War many controls were utilized by a specially-created War Industries Board. The difference now is that a comprehensive plan has been mapped in advance of war to avoid the chaos that existed then after the declaration of war. In order to assure an adequate supply of munitions and materials for the armed forces, as well as the civilian population, the Industrial Mobilization Plan now contemplates the control of the following in the nation's economic system: war labor, war trade, war finance, prices, transportation, power and fuel. Each of these will be so

controlled as to contribute to adequate munitions and adequate civilian supply. The more important measures which will be used in order to control these factors are:

(1) *Priority Control.* In establishing priorities in the use of materials, labor, finance, power and fuel, the purpose will be to direct the flow of materials and services into the channels of supply for the war-making agencies; to divert the use of resources from non-essential needs into channels of essential production; to assure the distribution of materials and services to the civilian population.

(2) *Price Control.* Certain conditions in war, particularly in the early stages, disturb the price structure. Among the contributing factors are unusual Government demands, diminished available supply for civilian use, reckless Government buying, high cost production because of the employment of unskilled workers, increased insurance, interest and tax rates, restriction of essential imports and inflation of the currency.

Price Control

The exact method of price control has not yet been determined; this is one of the problems now being studied by the National Advisory Defense Commission. In general, all prices fixed will be considered as maximum. Minimum prices will be prescribed only when such action is necessary to stimulate production to a point higher than has been brought about by current conditions or as a special aid to producers of a given commodity. The prices of certain groups of commodities, such as foodstuffs, are subject to great variation and rapid fluctuations due to a variety in grades and quality and to peculiar conditions which obtain in their production and distribution. It is probable, however, that margins of profit will be prescribed for those engaged in the production and distribution of such commodities.

Producers and dealers in foodstuffs, certain basic raw materials and manufactured necessities will be put under license control. The licenses issued to them may specify margins of profit and other conditions under which licensees are required to operate.

In order to retard the anticipated war tendency toward an undue rise in the prices of real estate and rentals, a Presidential proclamation may be promulgated declaring it unlawful to buy, sell, rent or lease any real estate or dwelling, or business, at a higher rate or price than is in effect at the time designated. Modifi-

cation of this ruling will then be made from time to time in order to keep these prices in consonance with wages and commodity prices.

When the voluntary co-operation of the public or the producers cannot be enlisted in the enforcement of the contemplated War Price Control Commission's rulings it will have recourse to the following alternatives through any of the appropriate wartime control agencies:

- (1) Use of the priority function, limiting of necessary power, fuel, labor or transportation.
- (2) Revocation of licenses.
- (3) Rationing.
- (4) Prosecution of violators.
- (5) Commandeering and requisitioning of facilities and commodities.

However, one of the important observations that the Army and Navy Munitions Board has made in its study of price control is that prices cannot be controlled except where there exists physical control over the goods or services. The problem of enforcement is the one great obstacle to the imposition of a ceiling over all prices. The Board concedes that there probably never can be established a sufficiently powerful body to control all prices even if it were desired.

The likelihood, therefore, is that an effort will be made this time to control the basic prices, the prices of those goods and services which go into the elementary phases of the cost of living—food, clothing, rent. And the policeman for the maintenance of these prices will be the laborer himself, whose wage in turn has been regulated or determined under the activity of a War Labor Board.

Once the basic prices are controlled, the prices of luxuries, it is believed, will adjust themselves. At least their adjustment is of no substantial concern to the instrumentalities engaged in the prosecution of the war. It is almost certain that the cost-plus system will not again be attempted. In the matter of clothing, it is probable that margins of profit will be prescribed for manufacturers and dealers rather than the fixing of an exact price.

Labor Control

One of the major problems the War Labor Administration will have to face is that which caused greatest dissatisfaction on all sides during the first World War—labor migration. Solution of the labor problem, particularly that of migration, may be attempted by the use of four means. They are:

(1) Control of the cost of living and the keying of real wages to that of living costs for all workers.

(2) A single unified employment service to prevent competition for labor.

(3) The development of public opinion.

(4) Compulsory arbitration of disputes after all means of mediation have been exhausted.

In the course of my study of the War and Navy Departments' plans, one primary thought concerning the control of the nation's resources has impressed me most. That observation is, essentially, that it will be impossible to regulate or control the operations of one segment of our industrial economy without concomitant supervision of all of the other factors with which that segment is joined. Perhaps I can clarify this thought by an over-simplification:

Let us assume that in time of war the Army demands of General Motors that it produce two hundred military trucks monthly. This quantity is well within the peace-time capacity of General Motors. To assure delivery, the procuring agencies establish close observation of the activities of General Motors. In making the demand, a price is reached which on its face justifies the company's co-operation and assures it a reasonable profit.

Now, if the regulation, planning, compulsion and demands were to stop at that point, the likelihood is that the required production must sooner or later bog down. If the price of contributory materials required by General Motors were left subject to the operation of the economic laws of demand and supply in time of war; if a number of the strategic or critical raw materials—rubber, manganese, tin, etc.—which are necessary in the manufacture of those trucks were available or not depending on the freedom of world shipment at the time; if labor were left free to exercise the power which two new factors will have given it—the depletion of the labor market by protective mobilization and the increase of its value by the desperate need for its aid—and were permitted free exercise of that power through strike, slow-down, sit-down or any of the other useful weapons which are in labor's arsenal; if the components which go into the composition of the cost of living were undetermined by law, unsupervised by regulation and uncontrolled by Government—if any of these were permitted to function willy-nilly, despite the demands upon General Motors for its trucks, despite the threat even of commandeering the plant and equipment if the demand is not met, troops would walk to the encampments and battlefields, not ride.

We must all recognize the peace-time difficulty of publicly discussing any limitation of the freedom of labor, particularly during an era when labor has just begun to lose its milk teeth and sink its new-found molars into substantial food. But labor in time of war will pay two prices: (1) It must furnish the almost complete bulk of manpower in protective mobilization, since the bulk of the country is actually labor in field or factory; and (2) It must not in the exercise of either whim or direct need impede the flow of production needed for the successful conduct of the war. Will labor willingly pay these two prices?

Modern Warfare

There has been much loose talk of late that immediately upon the commencement of the next war our democracy dies. If plans have been made for the burial, I have not been apprized of them. If the statement is that modern warfare is fought under close to dictatorial powers, that statement is nearer to the truth.

Modern war presents little opportunity for parliamentary quibbling and offers small premium for sentimental sophistry. War effort must be fast, complete and unreserved, and frequently brutal—brutal in its effect on the civilian front as well as on the war front. But, and the reservation is a big "but," while the arena of control will shift from the halls of Congress to the office of an administrator, that administrator and those dictatorial powers will be no less under the control of public opinion in this democracy and no less subject to the vagaries of political pressure than they were in Congress. Under our form of government no matter how one-man the control, how drastic the regulation, the concessions which will be compelled from the various segments of economic society must be bought. Thus, if labor is to agree to absolute non-stoppage of essential productive activity, it will demand and must receive the following assurances:

(1) That industry will not be permitted to profiteer at the cost of the civilian population—and this means war profits control over industry.

(2) That industry will not be permitted to increase the cost of living unreasonably beyond labor's ability to pay—and this means price control.

(3) That labor will have the opportunity to earn its just share of any legitimate profits which war brings to industry—and this means the continuance of the right to collective bargaining and the assurance that legitimate demands requested in collective bargaining will be en-

forced by the Government if the freedom to strike no longer exists.

Now we begin to see the interrelationship between the segments of our economic society. If labor is to pay its price, it demands three guarantees which in turn are prices to be paid by industry. Will industry pay these prices? Will it submit to profit control, price control and collective bargaining? The answer here again is "Yes" if it in turn is guaranteed a number of things:

(1) That labor will not be permitted arbitrarily or unreasonably to make demands for wage increases which have no relationship to the profits of industry or the cost of living.

(2) That labor will not be permitted under any circumstances to stop production in essential enterprise.

(3) That industry will be assured adequate power, fuel, labor and the necessary raw materials which go into the construction of an essential commodity.

(4) That any war profits taxation will not only leave business with a profit but leave it with a cushion on which to fall back during the post-war readjustment.

(5) That it will be provided with the necessary labor, skilled and unskilled, despite conscription, and that it will be able to retain those of its key men who are vitally necessary to its activity.

(6) That the determination of what is essential enterprise and what is not essential in time of war will be reasonable.

(7) That it be informed promptly of the ways in

which business can best adjust itself and alter its activity in order to avoid wartime discontinuance and the resultant impossibility of peace-time resumption.

What will be considered an essential or non-essential enterprise? To what extent is pre-war thought being given to this most vital of all questions to industry? Here more than anywhere else industry needs the assurance that the determination will not be arbitrary or capricious. One amusing instance is related of the first World War. When a list of non-essential cotton manufacturers was compiled, the administrative officer in charge came to corset laces and in disposing of that problem, commented: "Corset laces are certainly not essential. They can just as well wear them without any trimming."

Such are the critical problems as I see them in the control of the nation's resources in time of war—critical not only because of their complexity but because they involve human emotions and public opinion. These latter factors mean that no matter what legislative authority is secured in the early days of the war, the various sections of the public involved must be prepared for the necessary adjustments before that time. Labor must know its responsibilities and its guarantees. Industry must know its profits and its inhibitions. And above all, Government must know that it will have at its command, with maximum efficiency and minimum cost, the machinery of war.

Structure of Annual Wage Plans

(Continued from page 115)

healthy sign. These employers are experimenting with many measures to smooth out the peaks and valleys of employment and testing the efficacy of each. Over a prolonged period they will have gathered a sufficient body of data so that they will know rather than guess what their problem of employment continuity is and how far they can prevent fluctuations. On these foundations, the superstructure of an annual wage plan may be built with assurance that it will not be abandoned at the first severe business recession. This policy is in marked contrast to the practice of some companies which first create the annual wage plan and then discover the necessity for employment stability if the plan is to succeed.

Summary

An annual wage can only be successful if the problem of employment stability has been solved. A cardinal principle of any such arrangement is an aggressive management which stimulates a continuous consumer demand for its goods, creates new products to fill in during off-seasons or to substitute for other articles which are losing favor and, in general, keeps the business on the upward trend in spite of minor seasonal fluctuations. It requires close co-ordination between the sales, production and personnel departments in order to provide for an even flow of production and to make the best use of the working force.

The Social Responsibility of Management Five Years Hence¹

A Symposium

Editor's Note:—Ideas concerning what constitutes management's social responsibility are as many and varied as there are persons who will discuss the subject. In an endeavor to bring together as representative a group of points of view as possible your program committee invited a panel of speakers which would constitute a cross-section of opinion. Persons representing other points of view were invited to participate in the discussion from the floor and the result was a lively and interesting session. The papers presented here are the prepared addresses of the men on the panel. The discussion was not reproduced.

REMARKS OF THE CHAIRMAN

By ASA S. KNOWLES

Dean, College of Business Administration,
Northeastern University, Boston

THE social responsibility of management is strikingly apparent when examined from the community viewpoint.

The depression of the past decade has demonstrated clearly that the welfare of towns and cities and even larger areas is almost wholly dependent upon the competence of those who manage the local industries and businesses. When they fail, payrolls cease, unemployment follows and perhaps the community is faced with the loss of its principal means of support.

Democracy depends upon a contented community, possible only where men have jobs, and reasonable security—for when men have no jobs they become good prospects for every kind of crackpot scheme for remedying the situation.

To nearly every thinking person it is self-evident that competent managers are so important to the community—to workers, consumers and even the preservation of its democratic government—that five years hence managers will not be able to direct their affairs without regard for the community's stake in the situation. In executing their jobs, managers will have to recognize a greater responsibility. And in those cases where incompetence is demonstrated, the community may feel the right to ask for a new deal in the business leaders directing its local business and industry.

The responsibility of management from the point of view of the consumer, the social scientist, the manager and the worker are presented here. Representatives of other groups are invited to contribute their discussion.

THE CONSUMER POINT OF VIEW

By PERCY S. BROWN

President, Consumer Distribution Corporation, New York

ANY attempt to evaluate management's position five years hence must be materially changed from what it was when this topic was assigned, because of the effect that the war in Europe will undoubtedly have on the problem. Whether America finally is drawn into the conflict or not, it is certain that an evaluation made under normal conditions would be different from one made under present conditions.

Beginning with the N. R. A., there was a gradual awakening of consumer consciousness which has continued and expanded. The rise in prices which accompanies war will now stimulate consumer interest, and lead consumer groups to consolidate their gains and effect co-ordination of effort and interests. Management, therefore, can expect and should prepare for a more coherent and effective consumer pressure than it has known in the past. The war has advanced this by years. In fact, it is my judgment that now that the war is on, the five-year period originally assigned should be two or perhaps three years.

Managers, whether engaged in directing, manufacturing or distributing activities, must face the inevitable pressure of consumer action. Consumers will not tolerate unwarranted price rises. They will see that governmental and other controls are devised. Management can meet this by anticipating legitimate consumer demands, or they can follow a traditional course, fight the consumer movement, welcome and abet price advances, and take the consequences. Fighting the consumer has not recently and cannot again prove permanently successful, nor in any way profitable.

What the consumer asks of management is neither

¹ Presented at the Annual Conference of The Society for the Advancement of Management, October 6, 1939.

improper nor excessive, and if carried out generally by management—and to do so within two to five years would be a simple program—will bring benefits not only to the consumer but to labor, management and invested capital. To attain the desired goal of social responsibility in from two to five years, it seems to me that management must:

1. Use the most efficient facilities of manufacturing and of distribution that it is possible to devise or find.
2. Use these facilities in the most efficient manner of which it is capable.
3. Plan its manufacturing and its distribution so scientifically that all goods will flow to the consumer with the least possible friction or resistance.
4. Insure through quality control that all goods are of a uniform, predetermined standard of quality, and through the publication of these standards and the establishment of informative labeling that the consumer knows just what she is buying.
5. Be able to face the consumer with a standard of hours and wages that assures the consumer that the American standard of living is, and will continue to be, on an increasingly higher scale.
6. Give assurances that the social security program is being adequately carried out and that employment regularization is being attained in the maximum degree possible within each given industry.
7. Readjust its concept of persuasive advertising and consider it from the standpoint of its cost and the effect of this cost on commodity prices.
8. Constantly research its price structure with a view not merely of controlling the rise of prices but of maintaining the lowest possible price consistent with reasonable profit.
9. Set up some formal relationship with the consumer by one of the following methods:
 - a. A consumer organization representative on the Board of Directors.
 - b. A small advisory consumer committee.
 - c. Periodical sampling of consumer attitudes by accepted survey methods.
10. Adjust itself to a certain amount of governmental "control," inasmuch as it will no doubt continue to use, as it has in the past, certain forms of government aid or subsidy and therefore should not be shocked if government continues to demand that certain rules be lived up to.

Perhaps one of the most important changes that management will have made by 1945 will be in its attitude

toward government. It will have learned that there is no final gain for anyone in an industrial sit-down strike as a means of bludgeoning government into a course of action, even though it may sincerely believe it is "best for the country." The penalties of such pressure action are too great, and aroused consumer interest through integrated consumer organizations can and will exercise a discipline on such reactionary management that will result in rapid changes in management that fails to conform to the social pattern of 1945.

Most of the goals—which if attained will establish new high standards for consumer goods both with respect to their known qualities and favorable prices—can be reached if management proceeds as follows as a matter of sound policy:

1. Management must make studies of manufacturing and distributive costs and the causes of their being high, so that it will constantly and strongly resist the lure of higher price levels. It should rather endeavor to establish and maintain the lowest price levels, which accompanied by efficient operation will insure a reasonable profit to the owners of the business.
2. In carrying out its responsibilities to consumers, management will of necessity continue a practice which is now increasingly prevalent, of effecting and maintaining fixed standards of quality. In doing this, however, it will find that it is to its interest to accept and not fight the trend toward informative labeling and the publication of standards by which quality is determined. An example of intelligent informative labeling is found in the organized consumer co-operative wholesales handling foodstuffs. They have no difficulty in inducing packers to co-operate with them in telling the truth, and more than that, giving much valuable information about the contents of the cans or packages sold under the co-operative label. In like manner, some manufacturers, particularly in the textile field, have made useful and intelligent contributions to informative labeling.

Let me point out that the consumer will not be fooled by any attempts to offset concealed price rises through lowering standards of quality. Management, however, cannot stop here. Up to now it has made little or no effort to do more than to determine salability of its products and their serviceability. Before five years are over it will have become a not unusual practice for manufacturers, and perhaps for distributors, to evaluate their products not only in terms of salability and serviceability, but in terms of acceptability. This latter word is not truly descriptive. What I am driving at is that the consumer may tire of certain products, and this may

be due to over-styling or to too elaborate design, or to too great serviceability, and consequently too high price for the given situation, or to too much or too little color. I recently heard that some industries have already begun experiments in this field, and that is a most promising sign. Consumer attitudes from this standpoint must soon be examined.

3. It must be sure that those employed in the manufacture, conversion or sale of commodities shall be properly compensated for their efforts. This merely means that management faces the responsibility of paying the highest possible wages that efficient management is capable of paying, in order that an increasingly higher standard of living may be attained by American workers.

4. Management must evaluate the movement toward the lowest possible number of working hours that will be profitable to all, resorting to multiple shifts to assure full and economic use of facilities. I am not one who can become emotionally stirred by the expressed fears of some, that American workers and their families will not know what to do with the leisure time which more rational working hours will provide. Higher incomes from higher wages can be used to advantage by everyone if given the time in which to use them.

5. As an accompaniment of higher wages and shorter hours, there must be, of course, assurance of the highest degree of social security to all workers. Management therefore faces a responsibility which it always has faced, and which it has never as a whole acted upon because of preoccupation with making and selling its goods. To avoid the cost of unemployment, it must regularize employment. No longer may we hope to avoid the issue by asserting that despite the fact that Company A or B has done it, our case is so different that we cannot do it. Social security laws will force management to find means of regularizing employment, if only to avoid the penalties of failure to attain regularization. Not merely regularization of employment, but preventive medicine through co-operative groups organized around clinics and hospitals, which will maintain the health of the personnel on a hitherto-undreamed-of scale, will develop, because it will be so profitable to keep employees well.

The Twentieth Century Fund, in its recently published report, *Does Distribution Cost Too Much?*, discusses some of these consumer-management problems. Its sponsoring committee found:

(a) Duplication of sales efforts, multiplicity of sales outlets, excessive services, multitudes of brands, and

unnecessary advertising—all caused by competitive conditions;

(b) Unreasonable demands and misinformed buying on the part of consumers;

(c) Lack of proper knowledge of costs among distributors, themselves, too great zeal for volume, poor management and planning, and unwise price policies.

Furthermore, this same committee in its recommendations concerning consumer knowledge, urged the necessity for retailers attempting a system which would clearly show separate prices for a single article depending upon the amount of services involved in its sale, such as credit, delivery, etc. This would lead to the practice that purchases made for cash and carried out of the store by the consumer and not returned would be made at the minimum cost. The committee further recommended that there be an expansion of government agencies to provide information to consumers for efficient buying, and for the testing and appraising of consumer goods. It urged the extension and more effective use of voluntary private non-profit testing and reporting agencies, the strengthening of laws to protect the consumer, and the extension and development of courses on consumer problems in educational institutions. Finally, it recommended the further organization of consumer co-operatives and consumer group buying agencies.

These findings, based on the consumer interest in the distribution problem, are of importance to us as they support the thesis that management must increasingly be concerned with the problem of supplying well-informed consumers with goods and services of measurable quality at minimum cost.

By taking the course outlined herein, management will, in my judgment, meet its social responsibility.

THE SOCIAL SCIENCE POINT OF VIEW

By CARL J. FRIEDRICH

Harvard University, Cambridge

MANAGEMENT is an extension of scientific attitudes into the field of human relationships throughout our society. Hence the science of management is of greatest importance to the social scientist. Human relationships in the past were conducted according to tradition, custom and folklore. Today science is taking their place. It is no accident that the most rapid development along these lines occurred in the United States, because here the children of many

different nationalities with different customs have to collaborate. The folklore of any one of them cannot be a guide to management. We must search for more objective standards.

Scientific management raises the most interesting problems in public administration. Mr. Stone has spoken to you on that subject.² It is significant that the president's report which Mr. Stone is called upon to carry into effect was entitled "Administrative Management." In response to this novel development, programs are being formulated in all institutions of higher learning for the preparation of young men and women. At Harvard we now have, as a result of this interest, the new Graduate School of Public Administration exclusively devoted to the training of people who will be called upon to manage the nation's administrative offices.

It may be of interest for you to know of one or two of the researches that are now being pushed by our group. There is Professor Lambies' ambitious work in the field of developing effective tests for the efficiency of municipal enterprises. At the present time, we are unable to say whether one town is better administered than another. There are no objective standards for efficiency in say the fire departments. You can readily see how much scientific management would gain from an answer to these questions. Another point that I may mention is concerned with my own work in public opinion and relations. All businesses and governmental agencies are becoming more and more concerned with rationalizing these aspects of their work. Research showing to what extent they are successful will decidedly increase the effectiveness of management.

What can be the contribution of the social scientist to scientific management? In my opinion, the most important problems arise in connection with avoiding the dead alley bureaucracy which is a natural penchant in that direction. We must not allow our interest in analyzed procedures to carry us away. Mr. Ordway Tead has been one of the pathfinders in this field. The most important issue has arisen now over the government's way of operating the Civil Service. I think I can say that there is general agreement that our methods of selecting civil servants are completely antiquated. Vigorous efforts must be made to introduce more scientific methods here unless our services are to collapse.

This problem of selection presents great difficulties. We do not know what qualities constitute administra-

tive ability. The word is in everyone's mouth and on everyone's mind but it actually is an "x." It may be a complex of ascertainable traits or there may be different assortments of such traits each of which would do to make an effective administrator so that we would have several types. It may also be true that some of these traits are innate while others are acquired. We know too little about the lives of successful administrators. The committee of Public Administration of the Social Science Research Council has taken in hand the furtherance of this research. I cannot think of any problem that more urgently requires solution in the field of administrative management. If co-operation between the social sciences and scientific management could give us an answer in the course of the next five years we would have made a tremendous step forward. Here's hoping that we shall have that co-operation.

THE MANAGER'S POINT OF VIEW

By ARTHUR T. DAVENPORT

General Manager, Sweet-Orr & Company, Inc., New York

LET us assume, as a beginning, that the age-old axiom, "The first object of every business enterprise is to make money," is generally accepted and then let us follow it with the thought, not so self-evident, nor unfortunately as generally accepted, that the profits from such venture in order to insure its continuity over the years shall be apportioned speedily, accurately and honestly to three groups—labor, management and capital.

The efforts which have been made toward the sharing by these three groups on some sound basis seem to have fallen short of the desired end and there has been a tendency on the part of management and capital to foist upon labor a sharing of the cost of their own shortcomings and errors of judgment.

Labor's reward should be close to performance and should be determined primarily by quality and quantity of production, independent of any subsequent losses or profits that may be produced by other operations, as for instance, distribution.

Management's remuneration might possibly follow capital more closely. However, some successfully operated concerns have made a sharp distinction between capital and management. Where management has shared in the direct earnings promptly as earned, the results seem to have been more satisfactory and the

² Stone, Donald C, "Emerging Crises in Public Administration, the Country's Largest Management Problem," presented at the meeting on October 5, 1939.

plans have endured. Capital's reward, of course, lies in what is left.

As with the sharing of the rewards, so should there be a distribution of penalties. Capital has already borne more than its share with reduced earnings, absence of dividends and constantly increasing taxes. This seems to be an indication of the need for better management so that it will continue to be worth while for all three groups to participate in business enterprises and each receive its share of the reward.

THE WORKER'S POINT OF VIEW

By LOUIS MELTZER

Printer, Eagle Pencil Company, New York

FOR the past twenty years I have worked in numerous plants side by side with other workers, listened and learned various phrases, complaints, demands and expectations of the workers. In the company where I am now employed, I was in a small way instrumental in bringing about a model relationship between employer and employe, based upon faith in each other and a mutual regard in our welfare and progress. So partly through observation, and, partly through a small degree of experience, I will now try to give my views of the workers' character, complaints, demands and expectations, now and five years hence.

The worker of tomorrow will in character be no different than the worker of today. His chief concern and complaint will be about security.

During the past decade the worker has witnessed a most insecure and catastrophic condition with regard to steady employment. The machine age has been blamed as the cause of his insecurity. But this is not a completely true accusation as the worker realizes that the machine can be his salvation. However, he also realizes that mismanagement of the machine and of himself will enthrall him in a state of confusion and further lead to his alienation from industry.

During the last few score of years, industry has given more attention to machines and machine-like methods than to the worker. In accordance with this policy, industry has employed and trained supervisors and leaders who thought along those lines. Industry failed to realize that it is not the machine, but the worker who will consume and use up the produce. When the worker sees this occurring he is forced to think that he deserves the fruits of the machine he operates. He demands the means to enjoy the benefits of mechanical

progress. He demands that industry stabilize his position, stabilize his compensation, promote and develop his talents to his and industry's advantage. In other words, he demands the right to a stable economic life in order that he may enjoy a full private life and engage in the pursuit of happiness which is his inherited right.

How this is to be done he does not know, but he will more and more expect the leaders of industry to know. And you, gentlemen, must accept this challenge and find the answer.

One of the major complaints of the worker is that he does not have the opportunity to better himself. Usually he remains at the same job a lifetime and if that position is technically eliminated he is lost and so is his family and everything that depends on his position. This condition leads him to demand that he be trained for more than one job and also for chances of advancement.

The worker often asks the following questions: "Why am I not put in a position which will suit my talents rather than this humdrum job that does not interest me at all?" "Why am I not given proper training so that I can better my station in life?" The problem of industry is to fit each man into the scheme where he is most suitable, and, in return it is the individual's problem to find his niche. I beg you not to take this last statement as foolish and absurd; but to accept and develop it as a patriotic duty that will enrich this country both materially and culturally. In industry, capital, management, supervision and worker are the most important factors. If industry and labor are to march forward more attention must be paid to supervision. Successful supervision can only be measured by the frank and unfettered expressions of the employes. The cold, aloof, undemocratic attitude, the treatment of labor as a commodity and as a pawn, will not produce successful results now or in the future. Successful supervision can occur only when the supervisor has the intelligence to realize that a worker is a human being with an intricate group of emotions. He must be taught to realize that the worker today is no longer the foreigner of yesterday, who came to this country and considered anything an improvement. The workers of today and tomorrow are Americans who have been raised and accustomed to democracy and expect it in the mill. Realizing all this and coping with these problems constructively, the supervisor can bolster the morale of the worker and gain his faith and confidence for the

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The Development of Theory for Administration¹

By CHARLES E. MERRIAM

Member of the National Resources Planning Board

IT MAY be thought perhaps that there is no important or compelling relationship between the theory of politics, the theory of public administration, and the actual practice of administration. But in reality, the relationship is very close, and much confusion is caused by the failure to see and estimate public administration in its true and larger framework of theoretical and scientific progress.

I

Human behavior in political association is the subject of general political science, and involves the underlying theories and principles of political association and behavior. This requires rational analysis, examination of historical development, and skilled intimate observation. At times logic is the tool, again intuition, again precise measurement, in the search for new relations, new knowledge.

All this to be effective must of course be intimately related to a general framework of economics, history, philosophy, anthropology, psychology, biology. In modern times three great bodies of knowledge and practice lie close to this center: medicine, education, administration.

Public administration is a narrower field. It assumes the existence of general policies or objectives in a given political society, and is concerned with their implementation.

In public administration as in general political science, the problem of the form of approach arises—the rationalistic or the behavioristic. But in administration as in general political science these methods are not exclusive but complementary. There is need for general analysis of the purposes and significance of the fundamental elements of administration and for consideration of the ends and values of administration. There is also need for the study of administrative behavior in its historical and contemporary aspects and for the observation and analysis of what amount to experiments in administrative activity. This has led inevitably to the development of a body of general theory of administration and to

special branches of administration, such as the historical, legal, functional in nature.

In its earliest stages the study of administration was largely embodied in "manuals of practice" of the type well summed up in Von Mohl's *Cyclopaedia of Political Science* published in 1855, reciting long lists of titles taken from the field of French and German public administration. Later, formulations were made by a variety of types of scholars; some were primarily jurists—Goodnow, Jèze, Preuss, Freund; others were students of scientific management, engineering or psychology—Fayol, Urwick, Mayo; others were students of political science in the broader sense of the term—White, Gulick, Willoughby, Follett. Important contributions have also been made by those primarily concerned with the practice of administration and only secondary in theory, as for illustration Sir Arthur Salter in his *Shipping Board*. Dr. W. A. White in his *Autobiography of a Purpose* (p. 113), speaking of his experience as hospital superintendent, says: "I began to look for the general principles underlying the problems of administration. . . ."

Among the subjects of theoretical inquiry are the following—not set up as a complete or systematic listing—but as illustrative of types of investigation: (1) What are the ends and purposes of public administration; what are the outstanding values in administration in relation to other political and social values, such as justice, order, security, liberty, common good? (2) What is the essential nature and meaning of organization as such; what are the fundamentals of management; and what are their bearings on human association; what is the relationship between structure and function? (3) What are the chief types of controls and guidances in administration; what is the bearing of coercion and consent upon administration; what are the relative rôles of consultation, adjudication, expertism in actual practice? (4) What are the underlying types of integration and diffusion of authority; of centralization and decentralization; and what inferences are to be drawn? (5) What are the significant types of delegation, supervision, review; what are the types and spans of administrative control? (6) What are the rôles of the rational

¹ Reprinted by permission from the *Journal of Social Philosophy*, July, 1940, issue where it originally appeared entitled "Public Administration and Political Theory."

and irrational in administration; of stability and change; of leadership and co-operation?

There is encountered the problem of the social and psychological environment in which administration is set from time to time, as discussed by the personnel experts and by such thinkers as Mayo in his *Human Problems of an Industrial Civilization*. There is involved here the study of human nature in the mass-work environment under central direction of some sort.

These are topics to which inquirers of the type of Fayol, Urwick, Gulick, Follett have devoted attention—not, as a rule, systematically but incidentally and collaterally. Many students of administration have been gun-shy of the theoretical, regarding it as impractical or even irritating.

The study of the theory of organization is of far-reaching importance. Perhaps nothing in human life—public or private—political or industrial—transcends its significance at this stage of history. The function of organization in human society is that of facilitating human effort and achievement; that of providing an easier way of doing what otherwise is more difficult. Organization is a form of co-operation through which two or more are able to do what otherwise they could not do at all, or could not do as well. The achievements of modern society are largely products of sound organization—whether the unseen form of organization and co-operation required for walking in a crowded street, or the obvious mechanized organization found in the operation of industry.

Yet much organization is ineffective, and is found to be unpleasant, painful, irksome or oppressive. Hence organization is often identified with obstacles, difficulties, inefficiency. Diligent search must be made for the diagnosis that will reveal the malfunctioning of organization. But this requires a much sharper analysis of the *raison d'être* of organization and its function in administrative activities than is thus far available. There is needed an analysis of the guiding principle of action in the given situation—the end or purpose in view, the type of organization most adequate, and the impact of the organization upon particular personalities and upon special social milieus; analysis of results; and of course the invention of superior ways of achieving ends through forms of organization. If the organization does not aid the personality and serve the group, it is obviously a dead weight to be cast off.

It is essential to follow such problems wherever the trails may lead, whether through studies of personality, or social environment and conditioning, through the

mazes of rational analysis, through the flashing symbolisms of value systems which touch the human heart; through the intricacies of finespun categories of juristic analysis; through close observation of specific cases; through precise measurement of results and practical judgment as well. This is a search which it may be said has just begun in the scientific sense, but with the vast masses of modern data accumulating and with the finer instruments of precision and analysis now available, has at least started on the way.

This is not a romantic quest for the Holy Grail. It is a practical necessity of inquiry in the modern day with crucial problems thrust upon us by the practical mechanical application of our own human intelligence to problems that had long escaped the net of the human mind. Of modern science we may say in the vernacular "we asked for it"; and now we have it in our midst. But thus far we find ourselves incapable of organizing adequately its immeasurable possibilities. The concepts outlined above have direct or indirect bearing on the problems of public administration, but are not yet thoroughly and systematically explored.

There are also the problems of the relation of public administration to other branches of government; to other forms of administration, industrial, ecclesiastical.

There have developed from time to time such special approaches to administration as the: (1) Historical, dealing with the development of administration at various times and places, with long-time trends and emerging problems; (2) Legal, dealing with administrative procedure in relation to the general system of public and private law; (3) Personnel, dealing with the bases of recruitment, promotion, discipline, separation, morale, involving the specialized use of psychological and related techniques; (4) Procedural—managerial, dealing with the flow and rhythm of operations in administration, with their analysis and control. Hypothesis and verification are found here often in nonscientific but effective form.

We are confronted by the unending problem of adjusting and combining the subject matter of special functions with the requirements of over-all organization, supervision and direction—of staff and line, of operation and long-time planning of such forms of direction as will produce the necessary unity of action, and of the demands of special services for special competence and technical skill in their particular domains.

There are functional inquiries dealing with welfare, health, education, military and the whole gamut of specialized activities of governments from time to time;

and with their regrouping in relation to each other and the whole administrative-political process. There are special branches of over-all management, dealing with finance, personnel, planning, reporting.

In these inquiries use has been made of various special techniques such as statistics, accounting, engineering, psychology, accurate observation and reporting. Relatively little attention has been given thus far to historical growth or to philosophical analysis. There is relatively little systematic discussion of administrative pathology, or many specific descriptions and discussions of what might be called administrative utopias, using this as a term to cover invention and imaginative projection. In the literature of public administration there are not many infernos² or many utopias.

One of the paradoxes of administration is that although it rests upon a fundamental assumption that there are basic uniformities in human behavior which may be observed and analyzed, and which may in consequence be regularized and systematized through administrative organizations, procedures and practices, administrators often tend to resist or ignore theoretical formulation. Many fail to see that they are not only artists, but in fact scientists, or at least technologists, applying science.

Administration itself in its best forms deals with anticipated uniformities, with reasonable expectancies in behavior, and with effective integration of essential factors in a going concern. Even the "rule of thumb" presupposes established uniformities woven into an operating pattern by a skillful observer, a skillful diagnostician, and a skillful inventor of possible courses of conduct. There are many unpredictables in administrative behavior and always will be, but there is also an area of activity which may be anticipated; otherwise there would be unending chaos. Without reliance upon some uniformities, the administrator could not establish order, discipline or morale in his situation. His "practical" rules refer back to recognized uniformities of behavior, and also to implicit principles of order, organization, justice, welfare. Only in this way does he avoid the "arbitrary" method which would weaken his arm. Conduct is not held to be "arbitrary" when it may be forecast in accordance with some set of principles, some code of understandings, which reflect the consensus of the group in which action is occurring. In this sense the successful administrator is dealing constantly with a body of group understandings or principles (explicit

or implicit) upon which he and others rely in their adjustments of activities in the administrative field.

Traditionally, administration has been an art, but an art with skills and techniques which are now gradually being transformed at many points through the instrumentalities of statistics, accounting, engineering, psychology, and through refined forms of analysis and interpretation. What emerges is a body of practice in which there are many kinds of precise measurement, many situations in which accurate forecasts may be made. Many types of generalizations are appearing, pushing up through the crust of tradition into the light of rational organization.

It will be seen from the foregoing that public administration is closely related to the general categories of political science in the larger sense. The ends and the means of administration are linked with the ends and means of the political association in theory as well as in practice.

More broadly speaking, administration is related to the general body of social science. While public administration is limited by the categories of the state, with its special forms of association and sanctions, there are activities in other social groups which may be classed under the general head of administration. In the church, in industry, in education, in professional and cultural societies of many types, there are forms of management which closely parallel the government of the political association. These generalized forms are discussed by sociologists in dealing with the community, by anthropologists in dealing with primitive human types, by economists, especially in relation to business organization, and by a wide variety of other agencies concerned with management in special domains of action.

The assumptions, observations, inferences, analyses and conclusions found in the generalized field of social science are intimately related to the processes of public administration and management. Intensive studies of these interrelations have not been made on a very wide scale thus far, but they are now under way. The present studies of Professor Floyd Reeves in this area of the theory of administration are of especial significance, although by no means complete at this time. Likewise the highly intensive studies of management in the industrial world are very closely tied up with like lines of inquiry in the governmental world, and indeed run parallel in many places. Many, but not of course all, of the analyses in one area are transferable to another, or at least adaptable in great measure.

I have heard it said that since administration is merely

² But see Mann's *Der Unterthan* for a study of lower levels of bureaucracy; and Bentham, Jeremy, "Official Aptitude Maximized is Expense Minimized," *Works*, Volume 5, pages 263-386.

the organization of means for the attainment of given ends, it is therefore not a possible science. Yet human association itself and all human knowledge is in one sense a means to an end. But the final and ultimate ends of human life are value systems, to which it is said the techniques of scientific inquiry do not apply. Obviously we cannot exclude administration (any more than other knowledge) from the category of science because it deals with *means* to ends.

It cannot escape observation, furthermore, that the ends or purposes of policy are very general in nature and must be so, and that the practical application of the end is often as important or more important than the original end itself. This application is often in the hands of administrative officials, however, and therefore the nature and forms of their activities are often as significant as the ends themselves.

In conclusion, it is clear that management is an aspect of social relationships which contains a body of personnel, of practices and processes, a series of data which are often observable very precisely and which are available subjects of analyses, interpretations, inferences with respect to general and continuing patterns of behavior in a special field of conduct.

To assert that the body of data and principles accumulated is not "knowledge" or "science," raises a question of definition which is not settled by mere assertion. We may in turn challenge the monopoly of those who are so supremely confident in their particular appraisals of "science" or "knowledge." Anyone may define anything as he likes, of course, as a starting point: but for purposes of effective interchange of ideas his verbal symbols must be accepted by others.

Without going into an elaborate discussion of the exact meaning of the word "science" (used in many different senses by competent thinkers), it is plain that the study of administration brings new knowledge about new relationships in the fields of political science and social science. Like medicine and engineering it bridges over from technology to scientific inquiry and back from research to technology again. The conceptual framework of administration and also its techniques of measurement, analysis, inference, interpretations and generalizations are thus far imperfectly developed. But they are not inherently incapable of development; and the process of elaboration and refinement is going forward rapidly in the light of modern knowledge. The right direction is more important at this stage than the tempo.

II

A question of basic importance is, of course, what is the relationship between practical administration and technical research in administration? How are the results of the special student transmitted to the administrator, and how are the long-time problems of the administrator taken over by the special student?

How rule of thumb passes over into technology and science is, to be sure, one of the most fascinating problems in the history of human learning. From mechanics to mathematics and back, from chemistry and biology to medicine and back again; these are among the epic stories of human conquest in the domain of knowledge. Likewise from rule of thumb administration to techniques of administration and reverse is an important process, not yet completed, in fact only recently begun in the light of modern discoveries.

A Chicago journal printed some years ago an account of what it was pleased to call the "strangest conference in history"—one between the "profs" and the "cops." It was held in Mandel Hall. I was defending the use of traffic statistics, and was supported by a police chief who said, according to the journal, "The prof is right; statistics is great; I use 'em to explain, and they can't answer me back, because I've got the dope."

It is probably true that administrators by and large do not know any more about philosophy than most philosophers know about administration. Those who understand both are not thus far numerous, but there are notable exceptions; and the number is increasing. It may be noted, however, that the question how any special skills are transmitted from the research center to the administrator is less difficult than the general question applied to all activities. For the administrator by the very nature of his occupation is a man accustomed to bringing together the various kinds of knowledge necessary for any given undertaking. Given the problem, he is required to find the special skills available and necessary, and to weave them in a web. He is a specialist in the bringing together of specialists for the performance of a particular task. No one is more frequently called upon for the recruitment and utilization of experts of various types than is the manager. That the skill is new and unknown to him personally is not a sufficient reason for not exploring its possibilities in the service of the particular enterprise for which he has been made responsible.

The chief obstacle to free interchange of new ideas, and the free flow of problems, lies in the resistance of

the mere routinizer, who does not wish to be disturbed by new problems and materials; as well as in the attitude of the highly skillful administrator who does not analyze the elements of his art so that they may be transmuted into a transferable technique. He may indeed regard these skills as being entirely personal and not capable of transmission: as a man of action he may look with suspicion upon ideas evolved from systematic reflection, rather than concrete experiences, fearing them to be impractical or impossible.

On the other hand, the theorist or the scientist may be unfamiliar with the feel of the material from which practical administration is woven, and unable to adapt himself to the use of the units and substances of the stuff with which he must deal. He may thus be precise in measurement, but not know what to measure. The practice of appointing competent scientists to administrative positions for which they may or may not be qualified has added to the difficulties at this point. Both practical administration and science have often suffered through this.

Looking back at the growth of public administration, we see in European countries a long and involved development. Military administration developed from the exigencies of warfare, and civil administration in its later stages from the need for better handling of proprietary domains of monarchs to whom, however, private possession and public law were one and the same. Impetus to the development of administration was given by the rise of the modern national state with its wide-reaching territories and its new forms of central control. The history of this movement has been presented by many students, although much remains to be done yet. Toynbee's *History* gives an amazing picture of the rise of various early types of administration, including the Roman, the Saracen, and the Western European.

In the United States our datum point is the Jacksonian doctrine of rotation, relatively harmless when started but becoming increasingly dangerous with the growth of specialization in all ways of life, industrial and governmental alike. After three generations of tolerance, we turned to the long task of developing a better system. The early methods for accomplishing this change were civil service reform, the criminal law and revolts against the rascals in office.

At the turn of the century began a series of new approaches to this problem of administrative betterment. These may be summed up as follows:

1. The organization of public employes themselves in

defense of the merit system, at first in behalf of what came to be called "tenure" of office, but later to other aims.

2. The organization of private bureaus of municipal research, of widely differing types (once organized as the Government Research Association).

3. Organization of public bureaus of administrative and governmental research in cities, states, United States.

4. Organizations of public officials concerned with professional standards of work, as the City Managers, centering in the Chicago grouping of associations. (See directory of agencies prepared by the Public Administration Clearing House.)

5. Efforts seen in a number of universities, such as Chicago, Syracuse, Harvard, Columbia, California, Wisconsin, Michigan, and in special institutions such as the Institute of Public Administration and the Brookings Institution. Some of these were frankly service or vocational agencies, others more concerned with research, and others carried on a combination of service and research activities.

6. In 1930 the Spelman Fund turned its attention to problems of public administration on the service side, and an important program of activity was developed.

7. President Roosevelt's Committee on Administrative Management (1935-37).

One of the surprising and gratifying developments of recent years has been the shift of various organizations of officials from interest in an annual junket to interest in systematic collection and use of data for administrative purposes—to organization in terms of modern service demands. It was to me an historic moment when the head of an association of officials said one day (as sadly as one of my faculty colleagues speaking of the University of Chicago football team) at the Quadrangle Club, "Professor, we are going in for research. We are going to use our annual junket money for research; this will raise hell with some of our members, but we are going to do it."

In the last few decades public officials have been confronted with many new techniques developing with the division of labor and with the magnitude of modern undertakings in industry and government. Among these are the devices of accounting and especially of cost accounting; a considerable range of statistical devices used as means of administrative operation and control; personnel tests, classification, and ratings as a part of the process of recruiting and managing thousands of men

occupied in many different tasks with many special skills; the techniques of management developing in industry and elsewhere, involving unique forms of cross blending of social engineering and psychology; institutional and functional experiments of all types often utilizing the most refined methods of observation and analysis, as in health, education, engineering.

In this process, governments themselves thus become not only service agencies, but centers of collection of data and of observation and inference of a scientific type in many different quarters. The recent elaborate report of the National Resources Committee on scientific research in the Federal government (amounting to \$120,000,000 a year) portrays this whole situation comprehensively and vividly.

The high point in this development in the field of administration is seen in the establishment (1939) of a special division of research in administrative management under the Federal Bureau of the Budget. This is set up for the continuing study of administrative organization and procedure on the highest levels. Along with this goes the systematic organization of statistical research in the Central Statistical Board, also under the Bureau of the Budget.

Likewise of great importance is the establishment of the Federal Personnel Council, including a personnel officer for each department, and the beginning of public service training in connection with the broader enterprise of vocational training. One of the new Administrative Assistants to the President—a career man—has recently been designated as a special liaison agent for contact with the problems of personnel organization and activity. Other developments such as the special schools maintained by the Departments of State and of Agriculture are of great significance in the cultivation of personnel standards.

An important meeting point between the academician and the official is found in the process of training for the administrative service—whether in the form of university pre-service training or in the form of in-service training. The formalized training of the academic type involves close contacts with scientific methods and results, to be supplemented by various forms of apprenticeship and internship, while the in-service training invites the inflow of the best results of practical experience and of technical achievement. Another point of contact is observed either when the student becomes an apprentice in an office or the official becomes a student in a university. The ins and outs of practical experience and of detached reflection are brought together in a

process which has far wider implications than does the immediate pedagogical effect; it makes possible a free interchange of points of view in a stimulating atmosphere.

In a transition period such as that through which we pass in the United States on the way to higher standards of public administration, this interchange is of great significance, not commonly estimated at its full value. One of the greatest of the practical problems arising here is, however, the lack of trained personnel, both in and out of the service, available without disrupting other services for supervision and conduct of this in-training system.

A special form of organization is seen in the Public Administration Committee of the Social Science Research Council. This Committee has carried forward a variety of activities directed toward the encouragement of scientific research, the co-ordination of research personnel and projects, and in some instances has undertaken projects itself.³

This Committee operates in connection with academic research groups such as Harvard, Columbia, Chicago, California, Virginia, Wisconsin and elsewhere, and with governmental officials as well. Examples of work are the study of the Department of Agriculture, the capturing and recording of the Agricultural Adjustment Administration experience, the study of the Tennessee Valley Authority and a long series of like undertakings. For several years the chairman of the Public Administration Committee was at the same time chairman of the Public Administration Clearing House and the Public Administration Service, thus providing for the time a form of liaison between the practitioners and the special students in the field of research.

Furthermore, the American Political Science Association has held a series of conferences in which public officials and students of government were brought together. On the whole, the interchange of ideas, experience, experiments between the practical administrator and the researcher is quietly proceeding at an absolutely unparalleled rate in this country.

In other times when government was autocratic or aristocratic, the administrative service was restricted in the main to a special class of persons recruited largely from a very narrow group, in spite of notable exceptions in the case of unusually talented individuals. In our democratic society the process has been somewhat slower, because of the early prejudice against effective administration as the tool of oppressors; but the tide is now

³ Annual reports available through the Social Science Research Council.

setting the other way, and it seems likely that a more effective public service will be developed than ever before. A career really opened to talent is a democratic service rooted in the democratic system of education and in the democratic way of life.

With (1) a freer interchange between the personnel of research centers and administrative service, (2) with the establishment of research centers in the administration itself, (3) with pre-service training in the schools and with in-service training in the government offices, the way is opened for more rapid circulation of ideas and experience than ever before in history. Contacts between theory and practice tend to become usual rather than occasional, vital rather than mechanical. This is a great and lasting achievement.

It cannot be said that the ideal balance has yet been attained, but amazing progress is well under way, and very notable achievement already scored in various offices. Both research and practical office management have a long way to go, but they are moving in the right direction.

In the period through which we are passing it is of the utmost importance to the welfare of mankind that the standards of public administration, both theoretical and practical, be maintained at the very highest possible level. This is due to the following considerations:

1. In a time of clashing social policies without a very clear directive upon which there is general agreement, the importance of sound administration is exceptionally great. If beneath the surface of the storm of public opinion there is a solid base of administrative efficiency, the shocks of strife are less heavy and less dangerous in their influence upon social relations. The French administrative system survived the French Revolution, and the German administration the recent German revolutions. In a well-administered city or state, political changes do not seriously interfere with the orderly course of affairs. But corrupt, ignorant, ill-trained administrators are not able to execute any policy effectively and the community suffers accordingly.

2. The flood of scientific research is rising higher and faster as time goes on, and there is every reason to anticipate that it will not slacken in our time. Engineering, psychology, education, biology, chemistry are altering the ways of life at a rate of speed never known before. The effective utilization of these results will require the services of highly competent administrators, capable of realizing their significance, sifting out the useful, and constantly rebuilding a balanced structure of the inner public service, and helping to plan for the future.

The "Futurama" in New York (General Motors' exhibit) has given a new vision to many persons who will vaguely press forward toward some such goal as there depicted, possibly without wise direction or without competent help even if the goal is possible. For the timing of the future is as important as its techniques. One of the great functions of management is to make transitions with the minimum of shock and loss. But this is a task for those who understand both the occult and the practical, and how to blend them in a working combination as we go along.

3. The administrative evils in the period we now approach require a different focus of attention from that of the earlier period. The pathology of administration for a long time was marked by the presence of corruption, ignorance, indolence, incompetence, favoritism, oppression. We have by no means emerged from this era yet, but we are on the way. But assuming that we emerge, a new set of difficulties may be expected, unless the greatest care is taken.

What are these? The new possibilities are those of arrogance and indifference to the public, lack of sympathy approaching harshness and cruelty, devotion to inflexibility and routine, grumbling at theory and change; procrastination, quibbling and delay; or the opposite of too great and rash speed without adequate preparation of the public for change.

Above all, there is the ever impending danger of the desire for personal self-perpetuation and expansion of power, bureaucratic parochialism of the pettiest type; the sabotage of the ends of office by placing the machinery or the person above the function he is there to serve; or the effort of the administrator to take over the rôle of the policy maker, by various devices, direct or otherwise.

These diseases are at times as hard to bear as chains and oppression; for they may spell power without even the graces or paternalism of ancient authority. There is no specific which will cure all these ills, but there are general conditions conducive to sound and healthy administration. None of these conditions is of greater significance, aside from responsibility to the community, than the maintenance of high professional standards of officialdom bridging over into high levels of technology and scientific research. The free interflow of ideas, inventions, experience, personalities is an indispensable condition for the attainment of the best administration.

In this country there are strong trends driving in from the background of general education, general democratic spirit, general recognition of the values of

science, technology, efficiency in industry, and in the larger sense of the term. This is not an ill-starred technocracy, but democracy using technology for the attainment of its ends.

Fifty years ago we carried the load of the spoils system and there was no body of organized thought regarding the problems of public administration. Now we are by way of ridding ourselves of the burdens of the patronage system and of building up a body of scientific knowledge in public administration. In the next stage our problem in America is:

1. To maintain unrelenting pressure on the spoils system, local, state and national, until it is abolished;
2. Continue the development of the science and technology of public administration in academic and governmental institutions with all the personnel and facilities essential;
3. Make sure that decisions where technical data are available shall not be made without knowledge of technical information and analysis and services of technical personnel;
4. Establish the best working relations between the scientific and the practical aspects of public administration by whatever devices will best promote the free interchange of experience—inferences, plans, programs, personnel.

Extraordinary progress has been made in this direction in the last ten years especially, but we are only mid-seas. In the meantime the demand for efficient public administration is growing greater, as national and international, military and civil emergencies spring up around us, threatening the course of rational action directed toward democratic goals.

What may we expect in the development of administration in the near future? Prophecy is always a difficult and dangerous task. I essay it diffidently and as a philosopher only. I anticipate:

1. The development of a body of general theory and science of public administration, drawing partly upon management studies, partly upon broad philosophical analysis, partly upon psychology, and partly upon a comparison of types and trends in administration.
2. The development of historical documentation of the growth of administration, through its various developmental stages.
3. The development of the legal implications of administration and particularly of the relations between management and administrative law, administrative justice, administrative procedure.
4. The development of reporting and accounting in

the administrative field, using modern tools of measurement, on a larger and more refined scale than thus far—a vast task in itself, opening up a wealth of data for purposes of administrative operation and control and likewise for objective study and analysis.

5. I anticipate the development of special types of studies, some of them in over-all management and others in the functional areas. Among the former—the over-all studies—are the examinations of fiscal, personnel and planning functions of administration. Of these, personnel studies are by far the most highly developed, using the techniques of psychology and statistics, and more broadly the study of personnel relations to the social surroundings in the large. Fiscal management is closely related to economic theory and practice, and opens out into wide areas of inquiry and inference concerning the problems of national income and outlay, expanding and contracting and on different levels. Planning management involving prevision and preparation of long-time integrated courses of action—a necessary incident in ordered progress—will necessarily require the earnest study of competent groups of students, recruited widely and broadly trained for their difficult task of forecasting trends and adjusting to them in the light of public policy and social and economic environment.

6. From another point of view it is inevitable that important contributions to management studies will be made by various functional groups of which the public service is made up. Specialized techniques such as health, welfare, education, industry, agriculture, military, deal with special problems and from their special points of view will arrive at important conclusions of general value, not alone for service groups but for students and scientists.

7. From my own point of view—not shared I think in general by all the responsible high priests of public administration—I should be interested in the development of some inquiries in administrative pathology on the one side and adventures in administrative idealism on the other. A few utopias would be useful in administration, even if the theoreticians or the practitioners were shocked; and a systematic exploration of the diseases of administration would be shocking but perhaps useful. A few flaming declarations of faith in the future and a few unsparing but intelligent diagnoses and even diatribes would improve the literature of administration if not its technical quality.

All this is pointed toward the fullest use of intelligence in the making of those administrative decisions on

which so great a part of human welfare depends. There is a central core of tested knowledge in public administration, available to those who will use it: and there is every reason to anticipate that this area will be enlarged and enriched with the progress of social science, and the fuller understanding of human behavior.

It is important at all times to scrutinize methods and results in any domain of action or inquiry, but it is supreme folly at this time to permit bickerings over the question whether administration is or is not a science,

to stand in the way of substantial progress in the direction of the welfare of mankind. In the language of Goethe, "Gray are all theories, green the shining tree of life." Administration is the throbbing center of modern association, tied in with the happiness of men and women everywhere. Administration is not outside the influence of human intelligence, but on the contrary responds to reasonable approach through theory and practice alike.

Economics for Industrial Engineers

(Continued from page 119)

unemployment does not lie with them. All the technical progress that has been made during the past years has resulted in a higher standard of living for those who have come in contact with it. Strictly, as an engineer, the duty of a time and motion study man is plain. If the benefits he provides are not used wisely, and if social injustice results, that is not his professional responsibility.

On the other hand, in a democracy each person is individually responsible for the direction of the social order. If as engineers we are not responsible for the way that our work is used, as citizens we are. The individual engineer, working for his particular employer, has nothing to say about the larger issues of this problem. But the engineer, through the exercise of his

ballot, and through the activities of his professional organization, can take an active interest in the economic system under which we operate, and should make all of his technical training available to society.

Certainly no one person knows how the economic system can be run so that labor saving devices will mean less work instead of unemployment, and this paper has not attempted to set forth any plan for accomplishing such an end. It is an important problem, however, and the ultimate solution will be found only if engineers are willing to face the facts honestly, and on the basis of these facts to contribute their training and skills, along with those of the lawyer, the economist and the politician.

The Social Responsibility of Management Five Years Hence

(Continued from page 129)

best interest of everyone concerned. Supervision in the future must build and teach the workers so that they may advance themselves. Above all, it must be remembered that a supervisor will not be tantamount to a taskmaster.

The most important demand, and indeed the one point the worker takes for granted, is collective bargaining; for it is only through strong collective agencies that the pulse of workers are made known to management, and grievances adjusted. In my opinion industry of tomorrow must sincerely and not through necessity recognize the efficiency of such a philosophy. Recognition of worthwhileness, the chance to participate in one's

own destiny, the opportunity to criticize procrastination and inefficiency, must be the workers' sacred privilege in the world of tomorrow.

I conclude with a challenge and plea that these demands should not be regarded as purely an academic gesture to be recorded in the files of time, but should be met in order to discontinue and put behind our backs those regrettable affairs of past relationships between capital and labor.

Then we can march forward to that period when there never more will be cause for the curse: "A plague on both your houses."

Double Logarithmic Diagram

For Determining Correct Production and Other Quantities

By PREBEN JESSEN
Consulting Engineer, Chicago and New York

Editor's Note:—The Society is always interested in presenting new tools or devices to aid in the solving of management problems. It is believed that a number of readers will find the diagram helpful in determining production, buying or stock quantities.

THE diagram consists of two sets of abscissas (for Y and K_2 values) and ordinates (for R and U values) so arranged that both apply to the same body of a double logarithmic diagram.

It presents a means for a rapid determination of the value of X, the correct production quantity, in the equation, $X = \sqrt{R} \frac{1}{\sqrt{Y}} \sqrt{U}$, whose derivation is explained below.

The diagram is first used to multiply \sqrt{R} by $\frac{1}{\sqrt{Y}}$, the product, K_1 , being read off the diagonal scale of the diagram (K_1 and X values) at the point where a horizontal line through the R value crosses a vertical line through the Y value.

The diagram is thereafter used to multiply the initial product, K_1 , by \sqrt{U} . (K_1 is now designated as K_2 for convenience in distinguishing between the two parts of the diagram.) This is done by reading the answer, X, off the diagonal scale of K_1 and X values at the point where a horizontal line through the U value crosses a vertical line through the K_2 value. The two points of intersection are marked on the diagram as (I) and (II), respectively.

The desired correct production (buying or stock) quantity, X, is the one showing the lowest total unit cost and resulting in a balance between the unit costs of "ready-making," $\frac{R}{X}$, and the unit costs covering storage and interest charges, $Y \frac{X}{U}$, or

$\left\{ S \left(1 - \frac{U}{P} \right) + \frac{C}{2} (I + F) \right\} \frac{X}{U}$, where the storage and interest charges for one year $S \left(1 - \frac{U}{P} \right) + \frac{C}{2} (I + F)$ is called Y, and $\frac{X}{U}$ is that fraction of a year for which the charges run for quantity X.

Derivation of the Equation

The total cost of each unit $V = C + \frac{R}{X} + \frac{Y}{U} X$ reaches minimum as the ratio of $\frac{V}{X}$ reaches zero $\left\{ \frac{dV}{dX} = 0 \right\}$, and $\frac{dV}{dX} = \text{Zero} - \frac{R}{X^2} + \frac{Y}{U}$ or $\frac{R}{X^2} = \frac{Y}{U}$ giving the equation $X = \sqrt{R} \frac{1}{\sqrt{Y}} \sqrt{U}$

Example 1. (Large quantity)

As an example on how to use the diagram let the necessary factors which should be known be as follows:

1. The estimated sale or usage of a certain article or material per year, $U = 160,000$ units.
2. The production capacity with the present equipment per year, $P = 1,600,000$ units. (based on the maximum daily rate of production for this article.)
3. Cost of material + labor + overhead, $C = \$1.00$ per unit. (Whereof \$0.30 is material cost.)
4. "Ready-making" includes all indirect labor and expense in connection with the following operations for one lot (quantity X).
 - A. Production set-up expense:
 - a. Planning and scheduling of the job, issuing of production and change of set-up orders, material and supply requisitions, etc.
 - b. Preparation and change of set-ups on machines to be used, including the transporting back and forth of tools, dies, and fixtures from their proper place and cleaning up of the machines after the run.
 - c. Time lost by the shifting of workmen to and from the machines and workplaces and in giving them instructions.
 - d. Excess handling, transport and control.

B. Buying of raw materials and supplies.

e. Issuance of the various requisitions, purchase orders and follow-ups by letter, telephone and telegraph.

f. Excess receiving and inspection expenses.

g. Excess transport and storing expenses.

The excesses (d, f and g above) mean the extent to which the normal overhead charge fails to cover these costs for the article in question as measured in terms of excess unit costs over the normal unit costs of these operations for normal-sized orders.

Let us assume that an equitable distribution of one of the above-named expenses could be made on the basis of 10 cents per order + 0.5 cent per pound + 0.3 cent per piece, and that the distribution basis formerly used was so much per order or so much per dollar. Then the excesses d, f and g would be the excesses of each cost figured by the correct method over the cost figured by the previously used method.

The "ready-making" cost, $R = \$36.00$ per lot.

The cost of the "ready-making" expenses are as follows:

A. Production set-up expenses:	Dollars
a. Planning and scheduling, stock requisitions	1.00
Issuing of production orders, follow-ups, etc.	1.00
b. Ready-making of machines, before and after fabrication	19.00
c. Shift of workmen to and from machines ..	2.00
d. Excess transportation and control	3.00
B. Buying expenses:	
e. Issuing of purchasing orders, requisitions, etc.	2.00
f. Excess receiving and inspection expenses..	2.00
g. Excess transportation of raw materials and supplies	6.00

36.00

5. Storage rental and store room service cost for raw materials and supplies, goods in process and finished goods based upon a fixed rate per cubic foot of storage space per year, and upon the storage space required per unit in cubic feet, $S = \$0.01$ per unit per year,

(of which \$0.002 is for storage of raw materials and supplies.)

6. Interest rate desired on capital tied up in inventory, equal to normal rate of return on the active capital in the factory. (Generally from 10% to 30% varying

when inventory is turned from two to six times per year.)

$I = \$0.20$ per dollar tied up in inventory per year.

7. Factor to cover taxes, insurance and uninsurable risks. (Generally from $\frac{1}{4}\%$ to 5%).

$F = \$0.02$ per dollar tied up in inventory per year.

8. Storage expenses plus interest, tax and insurance charges, $Y = S (1 - \frac{U}{P}) + \frac{C}{2} (I + F) = 0.01$

$$\left\{ 1 - \frac{160,000}{1,600,000} \right\} + \frac{1}{2} (0.20 + 0.02) =$$

$Y = \$0.119$ per unit per year,

(of which $\$0.035 = Y_{(1a)}$ is storage expenses plus interest, tax and insurance charges for raw materials and supplies only, and $\$0.084 = Y_{(1b)}$ is the storage expense and other charges for goods in process and finished goods.)

Only where materials and supplies are bought especially for the article or the product in question should the cost of these be included in C. In all other cases the production, purchasing and store-room departments should each use the diagram independently to determine the correct quantity in which to produce, buy and stock.

Using the symbols given above, the equation stating that the unit cost of ready-making equals the unit cost of storage expenses plus the unit cost of interest, tax, and insurance charges, reads as follows:

$$(1) \frac{R}{X} = S (1 - \frac{U}{P}) \frac{X}{U} + \frac{C}{2} (I + F) \frac{X}{U}, \text{ or}$$

$$(2) \frac{R}{X} = \left\{ S (1 - \frac{U}{P}) + \frac{C}{2} (I + F) \right\} \frac{X}{U},$$

$$(3) \text{ then } \frac{R}{X} = Y \frac{X}{U}, \text{ since } Y = S (1 - \frac{U}{P}) + \frac{C}{2} (I + F), \text{ whereof}$$

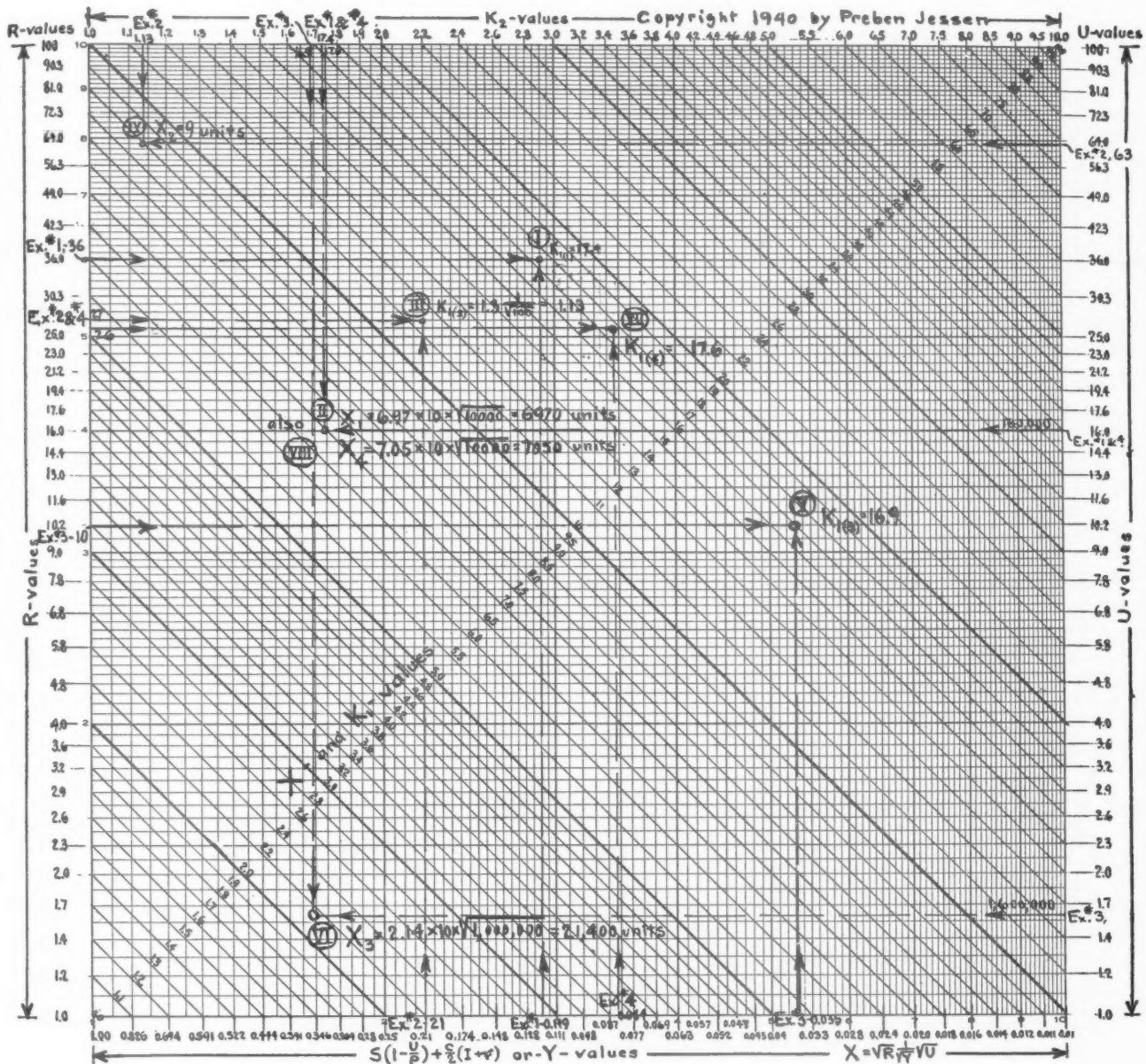
$$(4) X = \sqrt{R} \frac{1}{\sqrt{Y}} \sqrt{U}, \text{ where } X \text{ is read from the diagram, as explained on page 139, as 6970 units per lot (the correct production quantity.)}$$

Practical Proof of Equation

The total cost per unit is:

$$(5) V = C + \frac{R}{X} + Y \frac{X}{U}$$

DOUBLE LOGARITHMIC DIAGRAM FOR THE DETERMINATION OF QUANTITIES



By producing the 160,000 units in four lots of 40,000, in 132 lots of 1210 and in 23 lots of 6970 the total cost per unit will be:

$$\sqrt{40,000} = 1 + 0.0009 + 0.02975 = \$1.03065$$

$$\sqrt{1210} = 1 + 0.02975 + 0.0009 = \$1.03065$$

$$\sqrt{6970} = 1 + 0.00518 + 0.00518 = \$1.01036$$

The saving by producing the 160,000 units in the correct quantity is then:

$$(1.03065 - 1.01036) \quad 160,000 = \$3246.40$$

Example 2. (Small quantity)

As a second example on how to use the diagram to determine the correct production quantity, let us take

an article which is relatively costly and which is produced only in small lots.

1. Let one year's estimated sale be, $U = 63$ units
2. Capacity production per year, $P = 750$ units
3. Material, labor and overhead per unit, $C = \$100.00$
4. Ready-making per lot, $R = \$27.00$
5. Storage charges per unit per year, $S = \$12.00$
6. Interest rate desired on capital tied up in inventory per dollar per year, $I = \$0.18$
7. Factor to cover taxes, insurance and uninsurable risks per dollar per year, $F = \$0.02$
8. Storage expenses plus interest, tax and insurance charges per unit per year:

$$Y = S \left(1 - \frac{U}{P}\right) + \frac{C}{2} (I + F) = 12 \left(1 - \frac{63}{750}\right) + \frac{100}{2} (0.18 + 0.02) = 11 + 10 = \$21.00$$

By inserting the values of R and Y in the diagram, $K_{1(2)}$ is found to be 1.13, and by inserting 1.13 as $K_{2(2)}$ and U in the other part of the diagram, $X_{(2)}$ is found to be 9.

The correct production quantity, $X_{(2)}$, is therefore 9 units per lot. (The $K_{1(2)}$ and the $X_{(2)}$ points of intersection are marked on the diagram as (III) and (IV) respectively.)

(The difficulties which may be experienced in the first few days of using this diagram may be avoided altogether by adapting the diagram for each specific use by multiplying or dividing the U , R and Y values by 100 or multiples of 100. The K_1 , K_2 and X values are correspondingly multiplied or divided by 10 or multiples of 10.)

Proof of Saving

The total cost per unit by producing the 63 units in one lot of 63, in lots of 2, and in seven lots of 9, as determined by the diagram, will be as follows:

$$v_{63} = 100 + \frac{27}{63} + \frac{21 \cdot 63}{63} = 100 + 0.43 + 21 = \$121.43$$

$$v_2 = 100 + \frac{27}{2} + \frac{21 \cdot 2}{63} = 100 + 13.5 + 0.67 = \$114.17$$

$$v_9 = 100 + \frac{27}{9} + \frac{21 \cdot 9}{63} = 100 + 3.0 + 3.0 = \$106.00$$

The saving by producing the 63 units in the correct quantity is therefore $(121.43 - 106.00) 63 = \$992.09$ and $(114.17 - 106.00) 63 = \$514.71$ respectively or approximately 12%.

If the usage or sale is seasonal, or if the production must take place during a fractional part of the year, then the correct production quantity, X , is determined on the assumption that the yearly usage, U , is inversely proportional to the fraction of the year utilized in sale or production.

For instance if the production must take place during a three-month period every year, then the correct production quantity, X , is determined as if the yearly usage had been four times as large, or $4U$.

Example 3. (Correct buying quantity.)

Let us assume that material and supplies identical to those used in Example 1 are being used for other articles in a quantity for the year of $U = 1,600,000$ units. Then the correct buying quantity should be determined from the diagram independently of the production quantity. The ratio $\frac{U}{P}$ remains constant because P is increased in proportion to U . R , the "ready-making," is in this case the buying expenses and totals \$10.00 per lot. (See Example 1, point 4B and point 8.)

$$Y_{(1a)} = S \left(1 - \frac{U}{P}\right) + \frac{C}{2} (I + F) =$$

$$0.002 \left(1 - \frac{1,600,000}{16,000,000}\right) + \frac{0.3}{2} (0.20 + 0.02) =$$

$$0.0018 + 0.033 = \$0.035 \text{ per unit per year.}$$

$K_{1(3)}$ and $X_{(3)}$ are read off the diagram as 16.9 and 2.14 and are marked on the diagram as (V) and (VI) respectively.

The $X_{(3)}$ value must be multiplied by 10 because the K_1 value is ten times larger than the K_2 value found in the diagram, and by $\sqrt{1,000,000}$, because the U value is 1,000,000 times larger than the U value found in the diagram. The correct buying quantity, $X_{(3)}$, is therefore $2.14 \times 10 \times \sqrt{1,000,000} = 21,400$ units.

Example 4.

Determination of the correct production quantity for Example 1 when materials and supplies have already been bought and are in the store room.

Of the eight factors given in Example 1 the following four become changed.

3. Labor + overhead, $C = \$0.70$ per unit.
(Material cost \$0.30 is excluded)
4. The "ready-making" cost or production set-up expense, $R = \$26.00$ per lot.
(The buying expense of \$10.00 is excluded)

5. The storage rental and store room service cost per year, $S = \$0.002$ per unit.
8. The storage expenses plus desired interest, taxes, insurance and uninsurable risk charges, $Y_{(1b)} = \$0.08$ per unit per year.

$K_{1(4)}$ and $X_{(4)}$ are read off the diagram as 17.6 and 7.05, and marked on the diagram as (VII) and (VIII) respectively.

The correct production quantity $X_{(4)}$ must be multiplied by 10 and by $\sqrt{10,000}$ for the same reasons as stated in Example 3, and equals 7050 units.

Other Benefits From Using the Diagram

An important result from using the diagram is that the user's attention will be directed to many points where changes in the methods of production, cost accounting and pricing should be made.

Too large, or too small, inventories and store rooms, too costly ready-making on account of improper machines, tools, jigs, fixtures and dies, wrong prices and cost standards, are only a few of the many points which may be corrected by consistent use of the diagram. Losing money on articles produced in small quantities or on small orders need no longer take place unnoticed.

REVIEWS

Federal Administrators. By Arthur W. MacMahon and John D. Millett, Columbia University Press, New York, 1939, pages xiv, 524. (\$4.50)

This work bears the sub-title: "A Biographical Approach to the Problem of Departmental Management." One does not perceive its precise significance until one examines the preface and learns that the authors have undertaken to deal with the problem of management "in terms of individuals who hold positions in the national departments between the Secretary and the operating divisions in the bureaus."

The authors assert that the theme of their book is simple. They explain that departmental leadership has two phases, political and administrative, and that it must be implemented for both. They point out that administratively "there is need in each department for a focal personality who will direct the flow of command and integrate the work of a flexible group of supervisors. But the political head of the department must be equipped for the formulation of policy and its popularization. There is also need, therefore, for aides who serve at the will of the Secretary, free from routine responsibility." The supervisory group they define as the core of management; the aides they describe as advisory but "so complementary to the first group that they may be spoken of as an ingredient of management."

It is the conclusion of the authors that "without a headquarters personnel disposed in these two organs and suited to their purposes, departments can have no real existence. With such organs the departments can hope to play the role attributed to them, soundly enough, in the ideal of administrative segregation and coordination."

So much for an attempt to present the point of departure employed by the authors in the presentation of their comprehensive and illuminating study. In the development of their theme, the authors confine themselves to consideration of governmental personnel located at the pyramids of the ten Federal executive departments. They have divided their work into three major parts which deal, in the order stated, with (I) "The Organs of Leadership," a combination of theory and biographical material; (II) "Under-Secretaries and Assistant Secretaries," which is in the nature of an historical account embracing the indicated personnel in all ten departments; and (III) "The Bureau Link," as represented by the respective heads in the line of command.

What the authors have sought to accomplish by the method of treatment employed may best be revealed by the following quotation from the preface:

"The biographical method by which this theme is developed is suggested by the belief that practice often runs ahead of theory. The realization of an ideal is then to be found in the fulfillment of existing tendencies. The discovery of the latter requires a massing of details. These in turn shadow the outlines of the system which is emerging in response to inherent needs. The system must be recognized in order to be avowed. It must be avowed in order to be perfected."

This is a scholarly work, the product of what must have been an enormous amount of research in the field of biography and prolonged exploration of operating conditions in the executive departments. It is by no means easy reading, for the style and vocabulary employed are, in the literal sense of the word, arresting in character, and frequently challenge the reader's most concentrated attention.

The thread of discussion of management which runs through the book is at times so slender that it threatens to be submerged in the wealth of illustrative material. One cannot help wishing that more of management (as engineers understand the term) and less of biography had been presented to the reader, for this reviewer fears that the merit of the book is somewhat obscured by too scant a treatment of the substance of management.

On the strength of long continued contacts with governmental departments in Washington, the reviewer, moreover, finds it unfortunate that the authors have not stressed the all-pervading influence of the factor of size, which, in many instances, has far exceeded conditions in harmony with an optimum.

Co-ordination and control are subject to limitations with which even the most astute management may find itself unable to cope successfully; to suggest, as do the authors (see page 7), that "coordination can be accomplished partly by assemblies of technicians from various bureaus," seems to the reviewer to approximate a counsel of futility, for technicians are notoriously incapable of performing the synthesis which is an indispensable prerequisite to the attainment of a sound state of co-ordination. This observation applies to private industry no less than to the affairs of government.

Limitations of space preclude dealing with many aspects of MacMahon's and Millett's work that impress the reviewer as contributions to the advancement of knowledge in a field fraught

with much significance to our people. In all probability, the appeal of "Federal Administrators" will be confined to a relatively small circle of readers, but these will gain from its study much that may ultimately be reduced to formulas for constructive action, with consequent benefit to the important interests and objectives involved. Reviewed by HARRY ARTHUR HOPF, President, Hopf Institute of Management, Ossining, New York; Senior Partner, H. A. Hopf and Company, Management Engineers, New York.

National Welfare and Business Stability. By John Bauer, Harper & Brothers, New York and London, 1940, pages xi, 182. (\$2.00.)

Dr. Bauer has provided a well-documented discussion of the problem of depression and indicates that it must be solved under democratic institutions on pain of substitution of the newer and more positive method offered by Mr. Hitler. The author assumes, what few observers would now dare to deny, that a democratic government, by the law of self-preservation, must create a satisfactory balance within the economic system, or give place to one that will do better.

It is Dr. Bauer's thesis that an expanding economy and growing technology do actually open up vast new fields for private business. He points out, however, that there are other fields of equal importance which must be cultivated even though they do not offer the necessary features to draw on private enterprise. Government enterprise becomes, therefore, a factor of such magnitude that its expansion or contraction can determine the general trend of business.

The author discusses at length the reasons why private business, in itself, must necessarily be unstable. He points out, however, that at the same time the efficient use of modern technology becomes impossible without a stable market. Modern industry, like many of its detailed processes, can operate only in an air-conditioned environment, protected from the hot and cold waves of the business cycle. This air-conditioning has to be provided by government through the full development of the field of public works and services. To put it baldly, the government must make up all deficiencies in full employment, as and when needed.

The importance of this book lies in its keen analysis of the crucial problem that will face this country if and when peace returns, when the war-prosperity will have to be replaced by a prosperity founded on a vast program of internal improvement. Reviewed by DAVID CUSHMAN COYLE, Consulting Engineer, Washington.

Motion and Time Study. (Second Edition) By Ralph M. Barnes, John Wiley & Sons, Inc., New York, 1940, pages xi, 390. (\$3.75.)

The first edition of this splendid contribution to the literature of industrial engineering presented the history, scope and a practical guide to this important tool of management.

This second edition has been enriched by the inclusion of additional case histories from industry, as well as by a presentation of the results of fundamental research on motions and a method for determining time standards by combining therblig times.

Case histories in fields other than manufacturing as well as

those in the more familiar production applications are presented. They were undoubtedly carefully selected to further demonstrate the broader application of the principles of motion economy.

The painstaking researches described show a carefully conducted attempt to discover the fundamental relationships and factors influencing the performance of therbligs. From the results of these experiments conclusions are drawn which can be used by the practical motion economist provided he keeps in mind, of course, the laboratory nature of the studies. The value of such research as this to the field of industrial engineering is beyond measurement.

The chapters dealing with determining time standards are well presented. Some readers may feel they are somewhat short. If so, they can but hope the author will soon be able to apply the same thorough analytical study to this phase of the work as he has to motion study.

The engineer in industry will find the chapters on the use of elemental time data and formulas of great interest. Especially the chapters describing the use of standard time values for therbligs or combinations of therbligs. The examples given follow the applications step by step. If the relationships of these time values are proved by their application to industry generally they will represent a great forward step in this phase of the profession.

Those companies who contributed the case histories are to be congratulated for their enlightened attitude on such matters. They help to make the book a "must have" for every industrial engineer. Reviewed by J. K. LOUDEN, Supervisor, Standards Control Division, Owens-Illinois Glass Co., Toledo.

New Techniques for Supervisors and Foremen. By Albert Walton, McGraw-Hill Book Company, Inc., New York and London, 1940, pages vi, 233. (\$2.50.)

We are all getting a good laboratory course in human nature these days. Mr. Walton's book helps us to understand some of the reactions which we are getting.

How does fear affect our actions and reactions? Why do some people respond with action, others with emotion or words? How can we change attitudes or develop a new habit or skill? What is the relationship between aptitude and ability, between intelligence and education? How can we tell what we are getting when we hire a new employee? How can we build morale, reduce the cost of accidents, cut down the waste due to careless mistakes, and get our employees enthusiastically interested in their work?

Why do some individuals have inferiority or superiority complexes? Why do others have delusions of grandeur or of persecution? What kind of a person is best suited for research? What kind for publicity? What kind for a job requiring monotonous repetition? How can we improve our own abilities to manage, to train and to stimulate others?

Fourteen specific discussion projects are included in the text, to assist the reader in applying principles to specific situations.

If you are at times amazed, perplexed or angered, this book will assist you to acquire the patience, tolerance and sympathy needed to win today. Reviewed by C. S. COLER, Industrial Relations, Westinghouse Electric & Manufacturing Company.

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